

0101000010  
010000101010000110



# How We Fight

Handbook for the Naval Warfighter

# HOW WE FIGHT

## HANDBOOK FOR THE NAVAL WARFIGHTER

*U.S. GOVERNMENT  
OFFICIAL EDITION NOTICE*



### *Use of ISBN Prefix*

This is the Official U.S. Government edition of this publication and is herein identified to certify its authenticity. ISBN 978-1-935352-41-9 is for this U.S. Government Printing Office Official Edition only. The Superintendent of Documents of the U.S. Government Printing Office requests that any reprinted edition clearly be labeled as a copy of the authentic work with a new ISBN.

# HOW WE FIGHT

## HANDBOOK FOR THE NAVAL WARFIGHTER

---

For Sale by the Superintendent of Documents, U.S. Government Printing Office  
Internet: [bookstore.gpo.gov](http://bookstore.gpo.gov) Phone: toll free (866) 512-1800; DC area (202) 512-1800  
Fax: (202) 512-2104 Mail: Stop IDCC, Washington, DC 20402-00001

ISBN:978-1-935352-41-9

# TABLE OF CONTENTS

<i>Foreword</i> .....	xi
<i>Introduction</i> .....	1
Purpose of the Book.....	1
Logic of the Book .....	1
What the Book is Not About .....	2
The Need for Initiative, Leadership and Knowledge .....	2
Considering Future Actions .....	3

## CHAPTER 1

<i>Characteristics of the Maritime Environment</i> .....	5
Knowledge of a Multi-Dimensional Environment: Physical Characteristics .....	6
Extremes of the Environment .....	9
Challenges and Requirements of the Physical Environment .....	11
Experience, Vigilance and Foresight are Required Skills .....	12
The Maritime Environment Demands a Successful Crew Effort .....	14
Environment Defines the Platforms .....	15
Sea-Keeping Limits Space .....	16
Survivability Requires Efficient Design.....	17
Effects on Tactics and Combat Capabilities.....	18
Environment Shapes Navy Operations and Strategy .....	20
A Connective Tissue--An Economic Environment .....	21
From Physical to Economic Characteristics.....	22
Assured Access in the Economic Environment.....	24
The Sea as the Great Common.....	26
Protector of Prosperity .....	27
Political Characteristics of the Maritime Environment .....	28



Use of the Commons and Power Projection .....	29
Freedom of Navigation and International Law .....	30
Littorals as Population, Economic and Political Centers.....	31
Humanitarian Assistance and the Political Environment .....	32
Operational Requirements of the Environment .....	33
Innovation and Operations Across Mediums.....	33
Conclusion: Effects of Maritime Characteristics .....	34

## CHAPTER 2

<i>Attributes of U.S. Navy Forces</i> .....	37
Navy Combat Characteristics: The Threat Environment .....	37
Attributes of the Individual Sailor: Core Values and Initiative .....	38
Attributes of the Individual Sailor: Resilience and Self-Reliance .....	41
From Individual Attributes to the Functioning of the Crew.....	43
From the Attributes of the Crew to the Attributes of the Warship .....	45
Tactical Attributes of Naval Forces.....	47
Strategic Attributes of the U.S. Navy .....	51
Ability to Operate Forward .....	52
The Attribute of Nuclear and Complex “Conventional” Deterrence .....	54
Power Projection and All Domain Access.....	56
The Attribute of Sea Control and Area and Battlespace Control.....	58
Open and Wise to Technological Change .....	59
Capability to Generate and Handle Information.....	61
A Culture of Leadership .....	63
Attributes of Navy Forces and National Policy .....	65



## CHAPTER 3

<i>History of How We Fought</i> .....	69
Early Naval Warfare .....	70
From Rams to Fires.....	70
Revolution and Royal Navy Supremacy .....	71
Revolutionary Ships on the High Seas .....	73
Pirates, Privateers, and the Need for a U.S. Navy.....	74
Gunboats or Frigates and the War of 1812.....	75
Civil War Sea Control and Blockade of Southern Ports .....	78
War in Littoral Waters and Rivers.....	80
Rise of the Ironclads .....	82
Ships Against Forts.....	84
Defeat of the Commerce Raiders.....	86
Alfred Thayer Mahan and the Creation of a Global Navy .....	87
War with Spain .....	89
President Theodore Roosevelt and the Great White Fleet.....	90
Naval Innovation: Development of the Submarine .....	91
Naval Innovation: Experimentation and Rise of Carrier Aviation .....	94
Naval Innovation: Amphibious Warfare .....	96
Start of World War II .....	97
War Against the U-Boats .....	98
From Coral Sea to Midway .....	99
Submarine War Against Japan .....	103
Amphibious Assaults on Islands.....	104



Landings in Europe .....	108
Landings in Normandy .....	108
Kamikazes to A-Bombs.....	109
Navy's Role in the Cold War .....	111
Nuclear Submarine Development .....	117
Development of Naval Anti-Air Missiles.....	118
Navy in the Vietnam War.....	119
The Maritime Strategy and Collapse of the Soviet Union .....	120
Strikes From the Sea and Increasing Effects Ashore.....	123
Naval Intervention, Humanitarian Assistance, and Stability...From the Sea .....	128
Rise of New Global Challenges .....	130
Assuring Access.....	132
Partnerships with Other Navies .....	133
Enduring Requirements for American Naval Power .....	134

## CHAPTER 4

<i>Current and Future Operations</i> .....	137
Naval, Joint, Combined, and Coalition Warfare .....	137
Strategic Imperatives .....	140
Strategic Attributes, Enduring Missions, and Essential Functions.....	141
Maritime Security.....	143
All Domain Access .....	144
Humanitarian Assistance/Disaster Response.....	144
Types of War Fighting Operations.....	145





Air Warfare and Missile Defense.....	146
Electromagnetic Maneuver Warfare .....	147
Expeditionary Warfare.....	148
Information Warfare .....	149
Strike Warfare.....	150
Surface Warfare.....	151
Undersea Warfare .....	152
Cross-Warfare Functions .....	153
Tying Warfare Areas Together: The Kill Chain Approach.....	154
Spectrum of Operations.....	155
Recent and Current Operations.....	156
Future Operations .....	159
Conclusion: Three Tenets for Current and Future Operations.....	161

## CONCLUSION

Combination of Environment, Attributes and Warfighting .....	163
Take the Initiative .....	163
Challenges of the Future.....	164
Enduring Principles .....	165
Naval Professionalism.....	166





## Foreword

Over the years, Sailors have benefited from a number of handbooks such as the *Watch Officer's Guide* and *The Bluejackets' Manual* to learn the basics of our profession. In addition to rate and warfare specialty training, these references served as a foundation of knowledge on which generations of naval personnel built their professional careers. These books of seamanship, administration, and leadership are terrific guides for excelling in our profession.

"How We Fight" is a concise, single volume that explains the basic, unique, and enduring attributes associated with being a Sailor, going to sea, and conducting war at sea. It highlights the fundamentals of the environment in which the Navy operates, our uniquely maritime characteristics, our history in this domain, and the way of Navy warfighting. This book should serve as a companion piece to other sources of literature enabling Sailors to understand the essence of being "a Sailor" as they develop their skills as seagoing professionals.

Admiral Jonathan W. Greenert, U.S. Navy  
Chief of Naval Operations





# *Introduction*

Every Sailor is a warfighter first. The U.S. Navy exists to protect our nation and our access to the world. Our duty is to prevent and deter wars and, if necessary, fight and win them. The protection we provide the American people extends far beyond our homeland and includes the defense of our national interests and allies.

As a Service, the Navy is unique in that its continuing maintenance—directed by the U.S. Constitution—reflects the fact that our nation’s economic prosperity is based in a large part on international trade in products and resources, the majority of which travels by sea. We protect that access every day in peacetime. In conflict, we are dedicated to victory.

Those are facts we all know. We also know that our Navy is designed to operate forward in the far regions of the world. Much of our time, both in peace and conflict, is spent on deployment in the areas of potential crises, promoting, safeguarding and, when required, defeating an enemy and restoring the peace. We protect American interests on a global basis, something with which we are very familiar.

We know that we must “be ready”—fully prepared to conduct warfighting operations while forward deployed into regions of potential crisis and conflict.

What, then, is the purpose of this book?

## **Purpose of the Book**

Its purpose is simple—to articulate in a single volume the elements that determine the way we operate, as well as some of the overall concepts that guide our methods. We are shaped by so many factors: the maritime environment, our Service attributes, our history, and our current and projected future missions.

These are the factors we examine in these pages. The book is meant to put all these pieces together and define who we are and what we do in a comprehensive, yet readable fashion. For some, it is a good review of material they have long known. For others, it may hold ideas with which they are not as familiar or have never examined intently. For civilian readers, it helps to explain what the U.S. Navy is truly about: what it does for our nation, what molds its culture, and what makes it unique among our joint U.S. Armed Forces.

## **Logic of the Book**

The book proceeds in a logical sequence. Every Sailor must be a mariner. Thus, we begin with a general examination of the maritime environment and how it shapes, controls, facilitates and limits naval operations. The nature of seafaring helps to determine—along with the nature of war itself—the attributes of the Naval Service and the attributes expected of every sailor. These attributes have, in turn, helped to determine our history.



We take a brief look at U.S. Navy history because in this history we see our core values of honor, courage, and commitment become real in the lives and experiences of those Sailors who went before us. We explore individual vignettes that detail some of the key battles in our history. They are not all the decisive battles; they have been selected to illustrate the application of our attributes.

Then we examine current operating concepts painted with a broad brush—the “red-lead” warfighting basics.

The chapters build on each other like the decks of a ship. The maritime environment determines the fact that we are naval. Combined with the requirements for being a warfighter—which themselves are built on our core values—the maritime environment shapes our attributes. Our attributes—applied in war and peace—shape our history. Our history is our experience and provides the knowledge that helps craft our current operational concepts. This is the chain that links and defines us.

### What the Book is *Not* About

This book is *not* about hardware, platforms or systems. We briefly discuss the size of several current ships, but only to point to the limited space and volume within which they must carry multi-dimensional warfighting capabilities. There are no lists of ship types or weapons or planned acquisitions. There is no discussion of budgets. All of those things change as military technology evolves, missions are adjusted, our civilian leaders define policies, and the American people determine the course of the nation. There are many reference books, technical manuals, and tactical guides to consult to study the current characteristics and operations of specific platforms and weapons systems. In contrast, this book is about what does not change, what is *enduring*. The individual ship will always remain the building block of the Navy, just as the Sailor must be a mariner, and the maritime environment will remain the majority of our planet. Here, we examine the keel on which our global Navy is laid.

### The Need for Initiative, Leadership and Knowledge

Stressed throughout the book is the need for initiative and leadership on the part of every Sailor, no matter their rating, billet, specialty, or watch and duty station.

Initiative and leadership are part of our attributes, but they do not necessarily occur naturally. They must be developed individually within each Sailor. This book is not a treatise on leadership; there are no techniques discussed here. Nor are there extensive motivational exhortations on initiative. But as one reads the book, one cannot help but recognize that our strategic success—indeed our survival in the long, arduous, far-off forward deployments—has been the cumulative result of the dedicated initiative of countless American Sailors in the face of challenge and danger, and selfless leadership displayed at all levels of authority.

Over the years, many foreign navy leaders have remarked that the most notable attribute of U.S. Navy Sailors is personal initiative. It is apparent in our activity in both peace and war—how we have carried out our duties in the absence of specific directions and in urgent situations where action needed to be taken immediately.

It is also apparent in the pride shown by our Sailors in the careful execution of their responsibilities. Another noted attribute is how our Navy is designed to allow for, and depend on, expertise and experience applied by motivated leaders throughout the chain of command. When we faced off with the then-Soviet Navy in the Cold War, we were astonished to find that they did not have a professional Chief Petty Officer corps. Sailors of all rates seemed afraid to act beyond very specific and detailed orders from the highest authority. Our way is different. Part of it stems from the sense of freedom inherent in our democracy. But part of it comes from the combination of factors detailed in this book—mastery of the environment; cultivation of our attributes; inspiration of our history; and a professional core of free men and women who understand their reason for serving and work to both apply and refine of our operational practices.

### Considering Future Actions

As we individually work to apply and refine our operational practices to future naval requirements, there are questions we can always ask ourselves. How can we utilize initiative and leadership in our own encounters with the maritime environment? How can we apply them to strengthen the attributes of the Navy as we ourselves continue the Navy’s history? How can we best demonstrate them in warfighting? You are the only one who can decide how to apply your own form of initiative and leadership. Hopefully this book will inspire some thoughts.

Historically, economically, politically, and geographically, the American people are anchored to the sea. To understand how to defend our Nation and to recognize the importance of our own leadership and initiative in that effort, we must first understand the enduring logic behind how we fight.



# The Maritime Environment

## CHAPTER 1



### The Maritime Environment

#### Characteristics of the Maritime Environment



*Just before battle: Sailors in USS Alaska (CB-1) fix position by sun observation prior to battle for Iwo Jima, February 1945.*

Naval war fighting is shaped, regimented and restrained by the sea.

To understand naval warfare, one must first understand the sea.

To conduct naval warfare, one must first be able to routinely function at sea. The sea demands the utmost from a well-functioning and well-commanded crew.

This chapter focuses on the characteristics of the maritime environment as they affect naval war fighting. These maritime characteristics can be divided into three categories: physical, economic and political. But like everything about the sea, these characteristics are closely interdependent. No single aspect of the sea can truly be understood in isolation from all the others.

#### Understanding the Maritime Environment

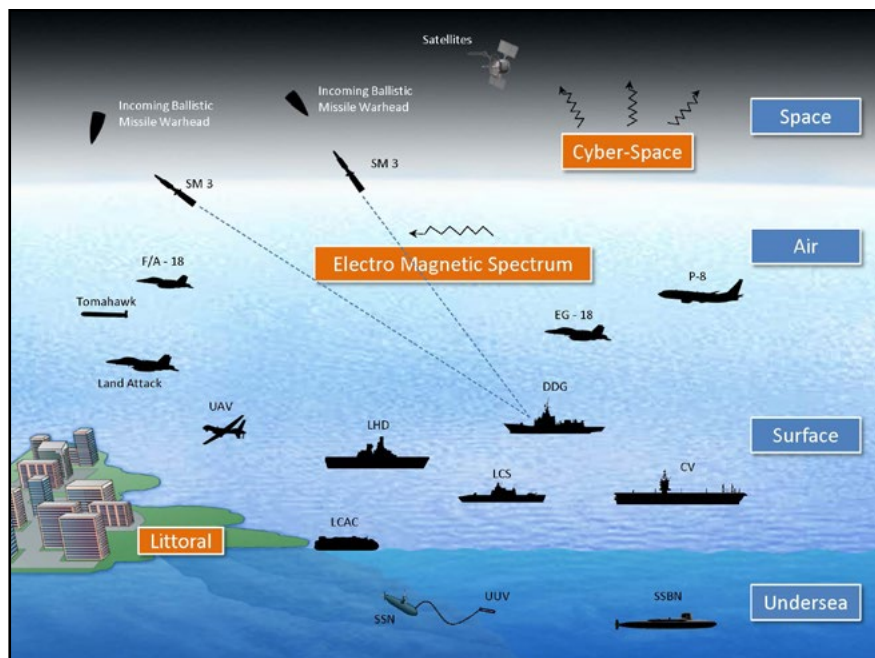
- Physical characteristics
- Economic characteristics
- Political characteristics



## Knowledge of a Multi-Dimensional Environment: Physical Characteristics

Our planet may be called the Earth, but the land space is relatively small. Seventy-two percent of the planet's surface is actually ocean, a multi-dimensional environment that both separates and connects the nations and peoples of the world.

This multi-dimensional medium consists of undersea, ocean surface, and the air space above, and adjoins the littorals and outer space—two other regions in which naval forces must operate. Another operational dimension for naval forces—cyber space—resembles the sea as a fluid medium which humans utilize but do not inhabit. Navies operating in such a multi-dimensional environment require a remarkably wide variety of platforms, systems, and training. The term platform is used throughout the book to indicate surface ships, submarines, aircraft or other manned craft.



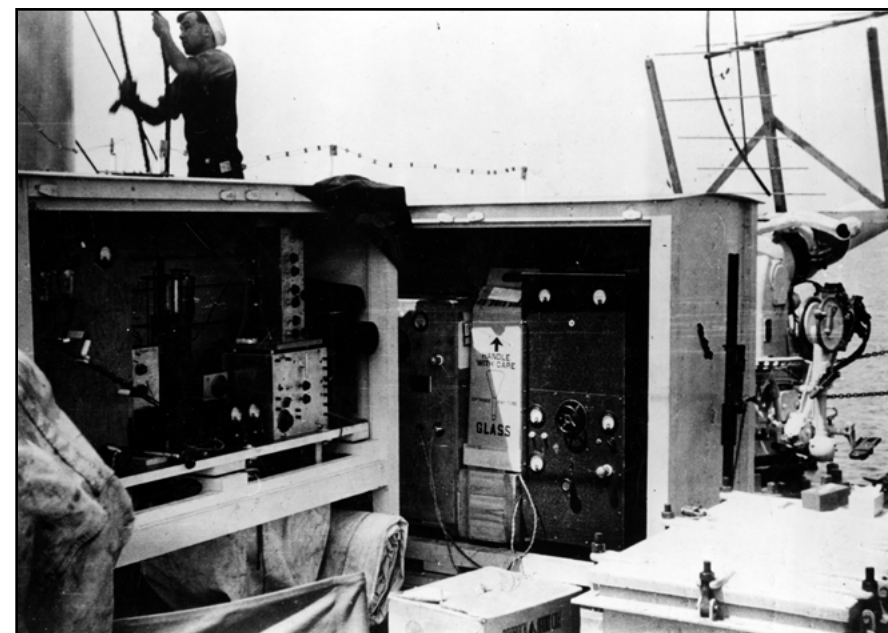
*Operating dimensions of U.S. Navy.*

This book is not intended to provide an in-depth explanation of physical maritime characteristics. There are many fine texts on seamanship, marine weather, ocean sciences, and naval engineering and architecture. You should avail yourself of these. Rather, it is intended to identify the basic principles of naval war fighting derived from these characteristics. Equally important, it is intended to reemphasize the importance of the knowledge you have already acquired and to

point out the need to constantly replenish your knowledge.

Our understanding of the maritime environment constantly evolves and expands.

This includes the characteristics that most affect naval war fighting. As examples, when sonar was first developed there was no real operational knowledge of shadow zones or deep scattering layers. When radar was first developed, the phenomena of trapping and ducting—particularly in unique regions such as the Persian Gulf—were merely conjectures. It was through the practical application of these devices at sea that their true capabilities--and limitations--become known, and with them a greater understanding and knowledge of the physical properties of the maritime environment, and how to operate our naval forces.



*First test of radar: U.S. Naval Research Laboratory equipment mounted in USS Leary (DD-158) in April 1937. The radar antenna was attached to the barrel of one of the 4"/50 guns (visible at right), allowing it to be trained in azimuth and elevation.*

## Combinations and Strength of Natural Forces

It is the interplay of the many dimensions of the maritime environment that makes it a dynamic, ever-changing combination of natural forces. The conditions at any one location on the surface of the ocean are influenced by the tide, current, climate, prevailing winds, weather patterns and other elements, all of which combine to create the sea states in which our warships must operate. Each of these factors is in turn the combination of other interacting phenomena. For example, tides are largely the product of the moon's gravitational force and local currents. Currents are the product of the general circulation of air masses, wind, water temperature,





land geography, and the earth's spherical shape and rotation, among other factors.

The interplay of tides, currents, and weather elements creates waves, the speed and energy of which can generate surf and breakers when approaching coastlines, islands, rocks and reefs.

How these forces act—not just the fact that they act together—determine conditions. As an example, winds blowing against a tide or current create greater sea disturbances than a wind blowing with the tide or current. At the same time, the sea below is affected by currents as well, along with temperature, salinity, pressures at different depths of water, sea life, and other undersea phenomena. Meanwhile, the air above the sea is obviously affected by weather, but conditions can also vary by altitude and be influenced by other atmospheric forces.



*USS Antietam (CG-54) encountering heavy seas in East China Sea, 2013.*

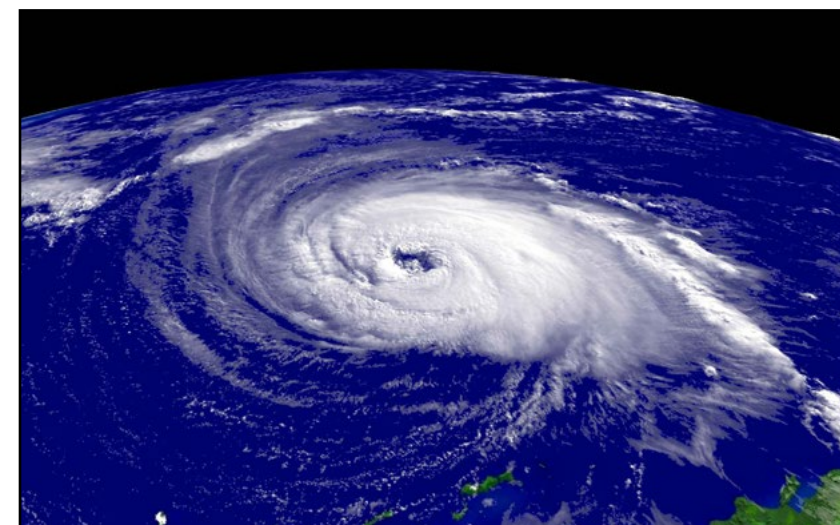
The interplay of all these phenomena creates the relentless, ever changing nature of the sea. Conditions change continuously, often dramatically and without warning. This differs greatly from the normally slower changes of conditions on land, which are comparatively more static, even when affected by inclement weather. Storms at sea are among the most powerful natural dangers that humans ever encounter. Even earthquakes do not buckle, twist, or shift land to the same extent as the potential moment-by-moment changes of the sea during a violent storm. This is one reason why naval forces face a much different and more physically dynamic and demanding environment than military forces on land. Conditions at sea influence the very movement of naval platforms; ships and aircraft may be prevented from traveling directly and rapidly from point “A” to point “B”, an important consideration in naval war fighting. Thus, for naval forces operating in the oceans, the enemy can be more than just the opposing armed force—it can be the very environment itself. The sea can be a peacetime as well as wartime “enemy.”

## Extremes of the Environment

The sea has indeed been called a cruel master and it requires the utmost in human endeavor to use it. The danger can be very high; it is claimed that on average more than 24 commercial ships sink or otherwise go missing (with their crews) every year—even in our age of information, communications, and satellite surveillance. Naval vessels—ships, submarines, and aircraft—must be designed for extreme forces in order to operate and survive.

Storms can be savage. To give some perspective on the natural forces encountered in storms, comparison with a nuclear weapon may help. The energy released by a one megaton nuclear weapon can be calculated as approximately  $1.75 \times 10$  to the 7<sup>th</sup> power in watts. Using the same method of calculation, a medium sized tropical cyclone or hurricane produces  $7.5 \times 10$  to the 24<sup>th</sup> power in watts—a billion-fold increase.

In addition to the great forces of violent storms, other extremes of the environment illustrate the challenge of seafaring. First, the total area of the maritime environment is itself extreme. The surface of the oceans extends to 139 million square miles (360 million square kilometers). Defining the entire littoral region (coastal land areas) in which naval forces also operate is an issue of debate, but since the earth has an estimated 217,490 miles (350,016 kilometers) of coastline, the littoral may encompass 43.4 million square miles (112.4 million square kilometers). Thus the total area of the maritime environment in which the U.S. Navy may be required to operate is in the neighborhood of 180 million square miles (466 million square kilometers).



*Satellite image of Hurricane Isabel located about 780 miles south-southeast of Cape Hatteras, NC. on 15 September 2003. The calm eye of the storm is quite visible. Winds around it averaged 140 knots while the hurricane moved toward land.*





*Breaking through ice: Virginia-class attack submarine USS New Mexico (SSN-779) surfaces in the Arctic, 22 March 2014.*

The depth of the oceans varies based on bottom contour, but the deepest location—the famed Challenger Deep in the Marianas Trench—is over 37,755 feet (10,898 meters). In contrast, the highest point above sea level, Mount Everest is 29,029 feet (8,848 meters).

The temperature of ocean water varies from 28.4 degrees Fahrenheit in the Polar Regions to 96.8 degrees Fahrenheit in the Persian Gulf.

Since ship propulsion plants and electronic systems routinely use ocean water cooling, sea water temperatures greatly affect the operation of these systems.

Winds at sea can vary from flat calm to greater than 130 knots at hurricane force. The direction can be from all points of the compass. Prevailing winds (winds that predominantly blow from the same general direction over a particular point



*“A Critical Situation”: Painting of USS Stockton (DD-73) narrowly avoiding collision in fog with a troopship she was escorting during World War One (1918).*

on the Earth’s surface) vary from very calm in the low pressure region around the equator (“the doldrums”) to an average speed of 15-24 knots in the high pressure region between latitudes 40 degrees South to 60 degrees South (often referred to as the “roaring forties”).

Visibility at sea can range from unlimited to zero in a dense fog. Fog is possible along most coasts; the foggiest place on the earth

is the ocean over the Grand Banks off Newfoundland, Canada, the meeting point of the cold Labrador Current with the warmer Gulf Stream. The Grand Banks has fog for over 200 days per year. Some coastlines, such as off Monterey, California, have a comparable number of foggy days that are the result of dramatic atmospheric differences between the land and ocean environments.

Ocean currents vary in direction and speed. The Gulf Stream off the U.S. Atlantic Coast adds 2-4 knots’ speed to ships steaming northward with the current and reduces the same amount of speed from vessels sailing south. This has considerable effects on fuel consumption. At the same time, there are undersea currents of

up to 3 knots in the opposite direction from surface currents.

The Strait of Gibraltar, where the Atlantic Ocean meets the Mediterranean Sea, has such an undercurrent, propelled by differences in salinity and density between the two bodies of water. Water from the Atlantic replenishes the Med via an eastward surface current while a westward undersea current spills denser water into the Atlantic depths. This phenomenon was used to great advantage by German U-Boats during World War II. A similar condition exists in the Strait of Hormuz.

Tidal currents are a phenomenon with considerable danger since they can drive unwary ships onto shoals or shore. The speed and direction of such currents change with the periodicity of the tide and are yet another illustration of the ever-changing conditions at any ocean location.

The point of identifying these extremes has been to emphasize the dynamic nature of the physical maritime environment and the inherent, continuing dangers of seafaring.

## Challenges and Requirements of the Physical Environment



*Able seamen of the early 1800s: Lieutenant Stephen Decatur leads U.S. Navy boarding party in harbor of Tripoli, North Africa (modern Libya) to destroy a captured warship, 16 February 1804.*

Seafaring is the attempt to understand and master this physical environment. Naval war fighting is very obviously an aspect of seafaring.

Captain John Paul Jones, the great naval hero of the American Revolution, is reported to have said that sailors and naval officers need to be more than capable mariners. In this he was quite correct. But his statement also implies that being a capable mariner is the first requirement, a prerequisite skill for learning the profession of arms at and from the sea. This is a priority Navy personnel must recognize, no matter their assignment. To be a naval warrior, one must first be an “able seaman”—traditionally defined as one demonstrating the skills necessary to be an effective and valuable member of a sea-going crew. In the days of sailing warships, an “able seaman” was one who knew how to “hand, reef, and steer,” as



well as “man a gun, fire a musket, and wield a pike or cutlass.”

But to operate at sea requires all hands to be familiar and knowledgeable of more than the basics of survival at sea. All hands must be able to understand the relationship between war fighting or support task and seafaring. A ship can not get to the fight if it is not seaworthy. Sailors or Naval officers cannot fully contribute to the war fighting mission of their ship or unit if they too are not seaworthy.

To be seaworthy, one must know and respect the challenges of the maritime environment. As discussed, these challenges include: tides and current; wind and waves; weather in all its variations; and type and depth of water. But they also include such physical factors of naval operations such as nature of the bottom; long transit distances over a trackless ocean; unique visual, acoustic and electromagnetic properties of air and sea; corrosion; and maintaining environmental balance.

The standard organization of ships and units are designed to meet these challenges. All hands play a role in the safety and survival of warships at sea. Operating in such a challenging environment requires such skills as: safe navigation transiting the open ocean; skilled ship handling in the face of narrow passages, maritime traffic, storms and turbulent weather; damage control in event of emergencies and dangerous operations; expertise in the use of rigging and ground tackle; and effective utilization of the electromagnetic and acoustic spectrum.

A prerequisite for being an effective naval leader is to know, respect, and ultimately overcome the challenges of the sea. While some billets require a specialized and highly detailed knowledge of particular maritime characteristics, such as oceanographers, aerographers, meteorologists, and marine engineers, all naval personnel—with emphasis on the all—must have a firm knowledge of the basic characteristics of the sea in all its moods. Initial education begins at training commands—providing the necessary basic skills. However, a more detailed knowledge of certain aspects will have to be acquired for most operational billets.

Academic knowledge itself is not enough. Operating in the dynamic naval environment—in other words, seafaring—also requires skills based on experience. For example, knowledge of the types and parts of ground tackle is essential, but true operational knowledge can only be acquired by participating in anchoring and mooring evolutions. An academic understanding of sound properties in water cannot equal the extensive experience and practical knowledge gained from many years of actual sonar operations and training. Being an “able seaman” in today’s Navy demands learning that intertwines education, training and experience. Warfare specialty qualification procedures and the Navy Leadership Development Strategy are all based on this multi-faceted approach.

### Experience, Vigilance and Foresight are Required Skills

Broad knowledge and experience are essential to the vigilance and foresight demanded by the maritime environment. For example, navigating the narrow seas in the littoral regions may be functionally similar to navigating in the open oceans,

but it relies on different tools and techniques, and demands greater precision and the utmost attention to detail. To be an effective navigator, one has to have the knowledge and experience to handle both situations. In transiting the considerable distance across the oceans to arrive in far away operational areas, naval platforms will routinely encounter both of these situations and much more.

Once they enter and operate within the littoral regions where the sea and the land come together—sometimes gradually and sometimes starkly—other tools, techniques, and skills apply.

Fleet Admiral Chester Nimitz, the Commander of Pacific Forces in World War II, had this to say about the necessity for vigilance: *“A large proportion of the disasters in tactics and maneuvers comes from concentration too much on one objective or urgency, at the cost of not being sufficiently alert for others....There is no rule that can cover this except the ancient one that eternal vigilance is the price of safety, no matter what the immediate distractions.”*

Gaining such knowledge and experience requires flexibility and adaptability in thought, as well as an eager willingness to apply one’s skills to situations of increasing complexity. Operating at sea requires a degree of humility as well as vigilance. As noted, the sea can turn unpredictable, and the forces at-play may rapidly change in strength. Immediate judgments may need to be made in the absence of complete information. Training and experience—particular the broadest of experience—provide the confidence to make such decisions. Nonetheless, one must retain the humility expressed in the lament of a traditional sailor’s prayer: “the sea is so strong and the ship is so small.”



*Ultimate disaster: Destroyers wrecked on the rocks of Honda Point, California, following squadron navigation error, 8 September 1923. It was the largest peacetime loss of U.S. Navy ships, with seven destroyers aground.*





Broad experience should best equip one to make decisions in the face of a lack of full information, and cautions one to account for what he or she really does not know, or knows only partially. This, in turn, fosters the mental discipline of constantly contemplating the “what if” questions that both inform decision-making and are the results of choices made. *If the depth of water is less than that indicated on the chart—what direction do I turn the ship to get her out of danger? If power is suddenly lost during this evolution and we are subjected to adverse conditions, what are my back-up measures? What are our actions in the event of an unexpected inshore current?* This is what we term necessary foresight.

Naval tasks are affected by the maritime environment in various ways. Merely navigating in and out port is a hazardous evolution because of the changing maritime landscape. Anti-submarine warfare operations differ significantly depending on whether they are conducted in open seas or in littoral regions because of the difference in the acoustic properties of water due to depth, bottom conditions, and the presence of thermal layers. Similarly, mine avoidance and clearance—and naval mine warfare overall—are often more demanding while transiting straits and conducting near shore operations than in deep water.

Under all circumstances, the foundational requirement for survival and operations at sea is the acquisition of knowledge and experience, and the constant replenishment of the knowledge of the characteristics and challenges of the maritime environment.

### The Maritime Environment Demands a Successful Crew Effort

The naval war fighting environment constantly requires an all hands effort. The very term “crew” signifies a team of sailors working together to survive, master the elements, and carry on a mission. In the most successful ships and Navy units, the crew works as a single living organism, each part working autonomously on its separate function in support of the whole. This work continues 24 hours a day, seven days a week, whether at sea, in port, during war or peace, and requires a seamless combination of specialties needed to perform all the functions of the ship. The engineering ratings provide the propulsion to maneuver the ship and the power for the sensors, communications, computers and weapons systems. Deck ratings are responsible for the physical operations of the ship. The electronics and systems technician ratings maintain these systems and ensure their readiness for battle. The operational and weapons ratings man the systems that fight the ship.

The service ratings maintain the well being of the crew and obtain, store and provide vital supplies. All hands involvement is required to provide the damage control readiness and emergency skills required to maintain the integrity of the ship in event of battle damage, other emergencies, or the severe aspects of the maritime environment.

The point of recalling these well-known functions is to reemphasize that the crew concept is the very basis for naval operations. No sailor can survive alone

in the maritime environment. No sailor fights alone. All Navy units must function with integral crews whether at sea, in the air, on land, or operating in space or cyberspace. Even naval special warfare personnel (SEALs) are trained to fight on land as teams, not as individual operators.

New personnel must be brought to a quick understanding of the environment. With this realization, each crew member is necessarily responsible for the at-sea training of new personnel. All lives are dependent on the effectiveness of such training.

The command structures of Navy units are designed to provide the leadership and organize the training to forge a tight bond within the crew and encourage the maximum effort of each individual sailor as part of a war fighting team.



*Trained to fight as a team: SEALs conducting an Over the Beach evolution, 25 May 2004.*

### Environment Defines the Platforms

A second principle is that the designs of warships are directly dependent—and in some cases, limited—by the physical characteristics of the sea. All factors, such as size and speed (which often are trade-offs) and even the overall expense of warships are driven by the requirements of the maritime environment. The sea brings constraints as well as advantages to design.

Equipment must be packed into the tight spaces of a specifically shaped hull, and both design and function must be tailored to the space. The spaces themselves are small to reduce the overall size of the ship for power and cost purposes. Such confines do not restrict most land-based systems, nor do their designs always have to take the severe characteristics of the maritime environment into consideration.

A ship is in constant motion on the sea. Sensors and systems need to function



amidst this motion. Weapons need to be stabilized from the effects of sea motion or be able to stabilize themselves once in flight. There are no external power sources; the ship needs to provide its own power, cooling, and mechanical functions.

It needs to move itself, whether at high speed, over long distances, or when only maintaining station.

### Sea-Keeping Limits Space

The *Arleigh Burke*-class destroyer at over 500 feet (154 meters) long, with a beam of 66 feet (20 meters) and a draft of 30.5 feet (9.3 meters) is a relatively small space to house the sensors, weapons, combat system, engineering, supplies, crew and all the equipment necessary for sustained operations at sea. The hull form and characteristics are designed to ensure safe steaming, effective damage control, survivability, protection and comfort for the crew, as well as to maintain readiness and sustainability over an extended service life. Warships must be designed to survive their natural environment as well as the combat environment. They have to pack tremendous firepower in a hull shaped and limited by the sea.

The *Virginia*-class submarine has a hull length of 377 feet (115 meters), a beam of 34 feet (10 meters), and a submerged displacement of 7,800 long tons (7,900 metric tons). (Submarines are not described in terms of draft.) Not only does that hull need to mount the sensors, systems and weapons necessary to conduct anti-submarine warfare (ASW), sea control, special operations, intelligence gathering, reconnaissance, and strike against targets ashore, it also must withstand the tremendous pressures of the ocean depths. It must do all these things stealthily, while maintaining the ability to operate extremely close to an enemy's shore. As always, the warship design is in great part dictated by the environment it which it must operate.



*BMD at sea: USS Hopper (DDG-70) launches a Standard Missile (SM) 3 Blk 1A, successfully intercepting short range ballistic missile target, 30 July 2009.*

A *Nimitz*-class aircraft carrier dwarfs other naval ships. With a length of 1092 feet (333 meters), a beam of 252 feet (76.8 meters), and a maximum navigational draft of 37 feet (11 meters), it is the largest warship yet built. With a standard air wing of 82 combat aircraft, its striking power rivals that of regional land air bases. Still, it is an extremely small space in which to operate such air power, along with its many other war fighting functions throughout multiple domains. An aircraft carrier also provides a level of command and control capabilities equal to or greater than that of shore-based operations centers. Yet, despite a massive size that gives it unique sea keeping characteristics in the face of storm, it still must be designed with the elements as well as its missions in mind. At sea, it faces environmental challenges that have no counterparts for air bases on land.

### Survivability Requires Efficient Design

Recalling these ship-class characteristics is to reemphasize that operations in the maritime environment require unique designs of great efficiency. Navy platforms must be designed to maximize combat power while retaining the sea keeping characteristics that allow them to take and keep the sea and remain in the environment in which they must operate. Just as Navy personnel must first be mariners in order to be war fighters, naval platforms must first be sea worthy in order to be combat worthy. All vessels are inevitably a compromise between size, internal volume and payload capacity, speed, and endurance, among other factors. As previously noted, the environmental challenges can be extreme. Storms and enormous waves have damaged and sunk many ships throughout the history of seafaring, including warships. Modern warships must be designed to sail through such extreme conditions and still complete their missions. The highest wave ever reliably recorded at sea was a towering 112 feet/34 meters high, recorded by a U.S. Navy oiler, *USS Ramapo* (AO-12) in 1933. Because of its robust ship design



*USS Carl Vinson (CVN-70) with Carrier Air Wing (CVW) 17 embarked transits the Strait of Hormuz, 16 February 2012.*

and skillful navigation, *Ramapo* was able to survive these seas and complete its fuel deliveries.

Extremes of weather often occur during wartime. In the days of oars and sails, unexpected storms sometimes put an end to maritime invasions by decimating entire fleets. The infamous term kamikaze was initially derived from the Japanese word for "divine wind," a description of two typhoons that destroyed invading Mongol fleets sent by Emperor Kublai Khan to conquer





Japan in 1274 and 1281. Without an effective navy and only a small land army, the typhoons were indeed fortunate for medieval Japan. About 300 years later, the British Royal Navy inflicted a severe defeat on the more powerful Spanish Armada and forced it north out of the English Channel. However, what really decimated the Armada and ensured that imperial Spain could not attempt follow-on operations were the winds and storms of the North Atlantic that drove so many Spanish warships on to the coasts of Scotland and Ireland.

Much more recently, and specific to our Navy, Typhoon Cobra in December 1944 caught the Third Fleet refueling at sea following air strikes against Imperial Japanese bases in the Philippine Islands. Encountering wind speeds over 120 knots and 70-degree rolls, three destroyers capsized and were lost (out of a total of 50 destroyers) and nine other ships, including escort aircraft carriers, were severely damaged. Many other ships—particularly the destroyers—might also have sunk had they not been designed to be able to ballast their empty fuel tanks with sea water in order to improve stability. This design characteristic, necessary for survival in extreme weather, had been incorporated because of our understanding of the physical environment.

### Effects on Tactics and Combat Capabilities

The maritime environment also directly shapes war fighting tactics and combat capabilities. In the 1980s, Vice Admiral Joseph Metcalf summarized the tactical goal of naval combat as putting “ordnance on target.” To put ordnance on target requires more than solving the technical problems of propulsion, firing and control of weapons. It also requires detecting, locating, tracking and targeting in inherently hostile environments. The characteristics of the weapons themselves must conform to the constraints of the environment. Ideally, the weapons must be able to take advantage of the environment.

Sensors are designed to penetrate the natural layers in air and water columns. One of the ways we overcome environmental interference is by using multiple types of sensors, weapons, and control systems connected together into war fighting networks. Electro-optical (visual) systems may not be able to penetrate fog or cloud cover—often referred to as the marine layer—but radar and infrared (IR) systems can detect targets under such conditions. Radars and infrared sensors, however, are line-of-sight systems; that is, they are limited by the natural curvature of the earth—a definite factor in combat over vast oceanic distances. This can be mitigated to some extent by placing radars and infrared equipment as high as possible above the waterline, which is one reason why modern warships retain masts, a vestige from the age of sail. Detection systems can be carried even higher in the atmosphere by aircraft or UAVs, thereby increasing their effective range. Satellites can increase the range even further, but such distances reduce the power output of the electro-magnetic systems and require them to be concentrated on specific areas. All off-board systems require long-range communications and data exchange, which can also be affected by the environment. Thus, a combination

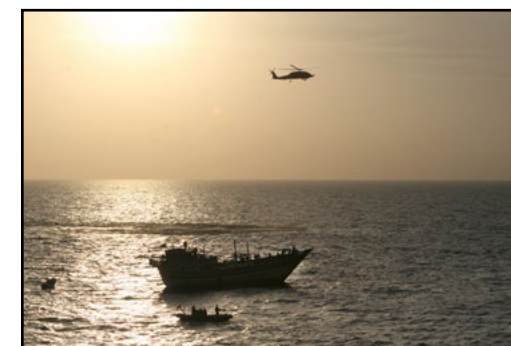
of a variety of sensors, operating in different spectrums and at different ranges, is required to effectively detect enemy forces operating in the oceans and littorals. This is true of all long-range war fighting—on land as well as sea. However, the physical features of the open ocean, vast and trackless, with limited locations for land-based detection systems, puts a premium on networked sensors positioned on individual platforms in fluid mediums—such as warships—in order to provide effective defensive and offensive capabilities where and when needed.

In our dynamic geo-political world, these locations change, and generally they move far distances. This is also a critical difference in the architecture of informational networks that support war fighting at sea, an architecture that necessarily must keep the physical characteristics of the maritime environment in mind—particularly in relation to defensive weapons systems. Unlike land-based systems, naval systems do not always defend a specific geographic location. They must also defend an ever-moving fleet. Individual ships are capable of defending

land areas—the BMD mission is one example—but ships move within their assigned mission area. The ability to engage in defensive and offensive operations rapidly through the movement of warships into crisis regions is one of the great advantages of naval forces.

This requires warships that can get there and be ready to fight. Their designs must blend the requirements of both mission and environment.

Tactics, combat capabilities and the physical characteristics of the maritime environment



*Interception in a vast ocean: SH-60 Sea Hawk helicopter and rigid-hull inflatable boat (RHIB) from USS Kidd (DDG-100) conduct visit, board, search and seizure (VBSS) on fishing dhow. Fifteen suspected pirates were taken into custody and the 13-man dhow crew was freed, 5 January 2012.*

are tightly interrelated. Navy war fighting tactics themselves are developed to employ the capabilities of the warships that are themselves shaped by their need to operate in the physical maritime environment. The range of available tactics is the result of the combat capabilities of the available naval platforms. Maneuvering capabilities needed to transit the sea—particularly through narrow seas and choke points—are the same capabilities needed and available for maneuvering in battle. A good tactician must also be a capable mariner. Ultimately, no aspect of naval war fighting can be separated from the physical characteristics of the maritime environment.



## Environment Shapes Navy Operations and Strategy

Naval operations are the way in which we employ ships, task groups, forces and fleets. Naval strategy is the way we use the Navy as a strategic asset of the United States. Considered together, both are more than the sum of cumulative naval tactics. Both are derived from the capabilities of individual warships, aircraft and other naval units, which are, in turn, shaped by the characteristics of the physical maritime environment in which they operate. It is the physical maritime environment that gives the Navy great opportunities in providing rapid, sustainable combat power on a global basis. The sea provides strategic advantages to navies that cannot be readily duplicated by land forces or land-based air power. These advantages originate in the inherent physical properties of water. A scientist once remarked, "Water is the greatest anti-gravity device in existence." Warships can transport themselves, as well as the land and air forces they may carry, rapidly and in a self-sustained manner throughout the globe.

The amount of combat power they can project into far regions exceeds that of air transport, particularly in areas where the United States does not possess base facilities. As a means of projecting power, navies are efficient and remarkably cost effective. In this role they provide their greatest contribution to the overall joint force.



*Visual deception in World War 2: USS San Diego (CL-53) appears in dazzle paint designed to throw off the periscope targeting solutions of enemy submarines.*

At the same time, the sea provides space for the maneuver of forces that is unequalled on land. One can compare the sea to the flat plains that favor armored combat, but on a scale that dwarfs any land region. Navy operational art and strategy take this vast maneuver potential as a starting point and, as previously noted, apply it to the specific geographic and hydrographic conditions of the regions

or areas in which naval forces are intended to operate. Other factors include climate, weather, distance from supporting units and the need for information and communications. The vastness of the oceans and the ocean environment also provide opportunities for cover and deception, elements that all operations planning and strategy must include.

Deception is at the opposite end of the detection equation; the ability to remain undetected by an enemy while gathering the necessary tactical intelligence for one's own combat operations could be the advantage that leads to victory.

Navy operational planning is complex, made greater still by environmental uncertainties. In conducting operations, planners must be as vigilant as watch standers in dealing with the sometimes capricious nature of the sea. Plans must often be adapted quickly to meet unexpected conditions or actions, such as changing weather. Weather forecasting, while it has become more of a science than an art form, never comes with absolute certainty. Weather affects war fighting. Planners and strategists must be capable mariners because the maritime environment is always an underlying factor in naval operations.

## A Connective Tissue--An Economic Environment

In joint planning discussions, the maritime environment is often referred to as a single "domain," but it is much more complex than that simple depiction. As well as being a multi-dimensional environment, it is a connective tissue of the planet that influences all aspects of human life on the land—from weather to global trade. When viewed from outer space, the Earth looks very blue. To travel from one of the major land spaces to another, one must cross this blue. It is the blue that connects these spaces together, necessitating the mastery of the physical environment.

Human life on our planet is intimately connected to the sea. Most of the great civilizations of the ancient world originated beside the sea or along the rivers that flow into them. Today, over 60 percent of the world's population lives within the littoral regions adjacent to the seas.

The impulse to sail the seas came from trade. The sea has been and remains the fastest and cheapest method of bulk transport between regions. Before the development of railroads, paved roads, and the internal combustion engine, rivers and seas were often the only way to transport heavy loads beyond a local market. Even the heroic voyages of discovery were motivated by trade; they were attempts to connect the world from one region to another to achieve an increase in resources and markets.

As sea-going technologies—the knowledge of ship-building, navigation, and map-making—evolved, humans endeavored to span the oceans, pushing the limits of distance and endurance. Contrary to myth, Columbus' sailors did not believe they might fall off the edge of the world. Rather, they were afraid of the weakness of their ships in the face of the savagery of ocean storms, as well as the depletion of their water and food long before land would be sighted.

It is logical to assume that use of the sea for maritime trade preceded the use of



the sea in warfare. However, we do know that existence of naval warfare closely followed that of maritime trade, both driven by the nature of the environment.

### *Physical Characteristics of the Maritime Environment*

- Multi-Dimensional: undersea, ocean surface, air space, littoral regions, outer space, cyberspace
- Tremendous strength of ever-changing natural forces
- Extremes of conditions
- Mastery requires knowledge, experience, vigilance, foresight
- Environment demands crew effort
- Along with required missions, defines the characteristics of naval platforms
- Affects war fighting tactics and combat capabilities
- Shapes naval operations and strategy

### **From Physical to Economic Characteristics**

As we have seen, the maritime environment presents challenges quite different from those in our natural habitat on land. This is the principal reason this “connective tissue” was historically difficult to develop.

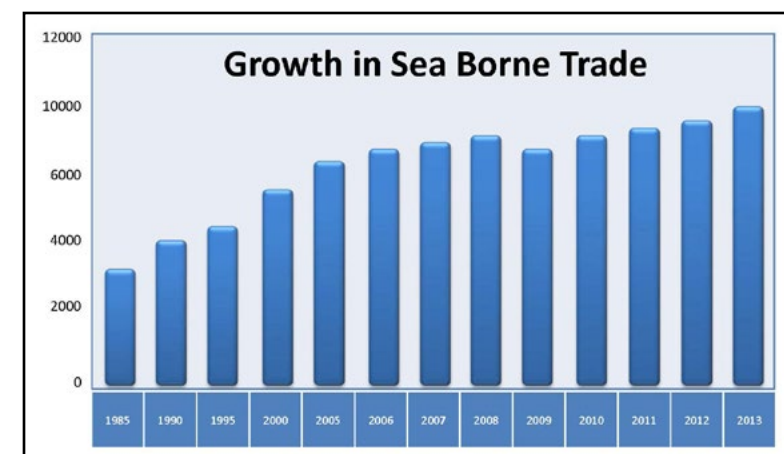
The motivation to overcome the most powerful forces of nature was clearly present. Spices from the Indies, gold from the New World, the marketing of manufactured goods to less industrialized regions were all keys to wealth in different eras. All required advances in seafaring and the development of new capabilities for transiting the maritime environment. The physical characteristics of the sea, particularly the “anti-gravity” property, are the enablers of global trade as much as they are for naval maneuver. The ultimate result was the political and economic systems we have today.

It is the most basic physical characteristic of water that is the foundation and necessary component of such commerce. Ships float and can be propelled to carry volumes of cargo unachievable by any single means on land or by air. When measured by weight or volume, 90 percent of today’s international trade is carried by sea, including much of the world’s raw materials. For some industrialized nations, over 90 percent of their energy supply travels by ship. In fact, seaborne international trade has increased an average of four percent annually for the past two decades.

Throughout its history, the United States’ economy expanded through international seaborne trade, first in agricultural products and then in manufactured goods. Today international trade—much of it seaborne—constitutes approximately

25 percent of the U.S. economy (exact estimates vary).

In 2013, U.S. overseas imports and exports were worth over \$4.8 trillion. One dollar out of every four circulated in the United States is connected in some way to international trade. One out of every six manufacturing jobs supports overseas trade. Many of our allies are even more economically dependent on foreign trade. As examples, 45 percent of the United Kingdom’s economy is related to international trade.



*Growth in Seaborne Trade: International trade by sea has increased by at least 4% for every year in recent decades, with the exception of 2009 during a global economic recession.*

In Australia, that figure is 37 percent. At the same time, many developing nations have turned to seaborne trade to buttress their future growth. Simply put, ships are the most economic means of transportation for the overall global economy.

This has been true throughout history and continues today. Methods of sea transport continue to evolve. While the internet and the electronic transfer of financial capital get the most publicity as the tools of modern globalization, a sound argument can be made that it was development of the container ship that was the true progenitor of globalization. This ship helped put the global economy into hyper-drive by bringing down the transportation costs—and consumer prices—of manufactured goods.

The container ship is but one of the latest innovations in an evolution in sea transport that has continued for over 2000 years. It was the need to protect such sea transport that provided the primary incentive for the initial development of navies. Today—in an era in which the United States Navy along with Allied and partner navies and militaries, are the primary guarantor of the freedom of the seas necessary for unimpeded global commerce—maritime security is primarily thought of in terms of protection against pirates operating largely from ungoverned states such as Somalia or against terrorist attacks.





However, this has not always been so. Maritime security in the form of the protection of sea-borne commerce from hostile states and non-state actors provided the initial justification for the construction and maintenance of permanent, standing navies. From this perspective, the U.S. Navy and Allies and partners are not simply the “keeper of the sea,” but the “keeper of international trade” as well. Since it is in the economic and political interests of the United States to assure the freedom of international trade, this is a responsibility with global consequences.



*Escorting merchant vessel: USS Whidbey Island (LSD-41) escorts a merchant vessel across the Gulf of Aden following its release by Saudi Pirates, December 15, 2007.*

### Assured Access in the Economic Environment

It is not just trade by sea or “international” trade that the U.S. Navy guarantees for America and her allies and partners; it is domestic production itself in our era of interdependent supply chains. Intermodal (ship, rail and truck) container transportation is tightly interwoven.

Today, many technological products “made in America” are actually assembled with parts and resources made elsewhere and brought to the U.S. Closure of or interference with the sea-link by hostile forces would have a devastating effect on this globally-stitched production network.

In today’s globalized economy and the general international support for non-interference with maritime trade, it is easy to forget that the protection of U.S. trade was always one of the wartime functions of the U.S. Navy. Capture, destruction and suppression of an enemy’s maritime trade has always been an objective in war, both as a means to throttle war supplies and a way of wrecking an enemy’s economy. In our early history, the United States was on the receiving end of such operations, losing many merchant ships to privateers as well as opposing warships.

Today this danger seems remote. Because the U.S. Navy is committed to ensuring freedom of the seas and international trade, today we possess the means to prevent any nation from interfering with the maritime trade of America and her allies and partners. This role was a primary reason that Congress re-established an American Navy in 1794, almost a decade after laying-up the Continental Navy in 1785, two years after the Revolutionary War ended. The new U.S. Navy’s first task was to defeat of the Barbary States of North Africa that had captured and ransomed U.S. commercial vessels and seamen sailing the Mediterranean.

The U.S. Navy also acts as a guarantor of American commercial access to global sources of raw materials. Again, the transport of bulky, voluminous raw materials over great distances is made possible by the physical characteristics of the oceans.

In protecting this transport, particularly through choke points and along sea lines of communications (SLOCs), and even into the ports of the source countries, the U.S. Navy ensures access to the materials required by the American economy. It also protects the access of other nations—not just allies as well. As an example, over 17 million barrels of oil transit by ship through the Strait of Hormuz each day.

Nearly 85 percent of this oil is destined for the Asian markets of Japan, India, South Korea and China.



*Vigilantly protecting trade: Lookout observes merchant ship in Gulf of Oman bound for the Strait of Hormuz, 29 March 2014.*

The terms “assured access” and “all domain access” are used to describe the U.S. Navy’s role in ensuring that our joint military power projection forces can enter contested global regions. They can also be used to describe the Navy’s assurance of access to the markets and materials necessary not just for U.S. economic growth, but also for our allies and partner nations who have accepted the global economic security provided by U.S. naval forces.





## The Sea as the Great Common

“Freedom of the Seas”—the principle that no nation owns the ocean space beyond its internationally agreed upon territorial waters—can be traced to the writings of a Dutch jurist of the 17<sup>th</sup> century, Hugo Grotius. It applies to naval as well as commercial vessels and is enshrined in customary international law of the sea as well as in the still controversial Law of the Sea Convention (LOSC) of 1982. The U.S. adheres to customary law of the sea as well as LOSC (although it has not yet ratified it). “Freedom of the Seas” can be considered part of both the economic and political characteristics of the maritime environment.

The United States and like-minded democracies have long supported the principle of “Freedom of the Seas”, while other states, particularly those with authoritarian governments, have frequently claimed possession of certain international waters. To ensure adherence to international law and prevent such claims, the U.S. Navy periodically conducts freedom of navigation (FON) operations in which our warships transit and operate in the very international waters encompassed by such claims.

Although the “Freedom of the Seas” principle had been in place for roughly 200 years, it was the American naval historian and strategist Captain Alfred Thayer Mahan, USN, who in first used the term “great common” to describe the oceans, a term still used by defense, economic and political analysts today. As the “great common” of the world, the seas are open to the use of all nations with the means of benefiting from its characteristics. But the use of this great common, whether for economic or political purposes, can only be guaranteed by those nations capable of defending their rights and access in the face of hostile, armed interference.

It is therefore navies—particularly the U.S. Navy—that ensures this access.



*Strategist of sea power: In a series of books published 1883-1913, Captain Alfred Thayer Mahan, USN established many of the modern concepts of sea power's application in both war and peace.*

Because we have the means, our Navy is often called upon to provide the leadership and resources to “police” the common, such as suppressing piracy in the North Arabian Sea off Somalia.

In 1890, Mahan was able to capture this need for our Navy with these prescient words:

*It is not the taking of individual ships or convoys, be they few or many, that strikes down the money power of a nation; it is the possession of that overbearing power on the sea which drives the enemy's flag from it, or allows it to appear only as the fugitive; and by controlling the great common, closes the highway by which commerce moves to and from the enemy's shore. This overbearing power can only be exercised by great navies.*

Historical experience, contemporary military threats, and Mahan's writing were partially responsible for convincing the President and Congress to build a truly great U.S. Navy at the start of the 20<sup>th</sup> century.

While Mahan's writings focused on the role of navies in closing the seas to enemy commerce during time of direct hostilities, it was none other that President George Washington who earlier explained the need for a navy even when America remained neutral during others' conflicts or did not intend to become a party to war. In doing so, he presaged the deterrent role that our Naval plays in ensuring U.S. economic access as well as defense:

*“It is our experience that the most sincere neutrality is not a sufficient guard against the depredations of nations at war. To secure respect to a neutral flag requires a naval force, organized and ready to vindicate it, from insult or aggression. This may even prevent the necessity of going to war, by discouraging the belligerent powers from committing such violations of the rights of the neutral party.”*

## Protector of Prosperity

Unfortunately for the early American republic, the construction of the initial U.S. Navy came too late to prevent the interference with, restrictions and capture of neutral U.S. ships during the wars between Great Britain and Napoleonic France in the early 1800s. Between 1803 and 1807, a period during which the U.S. was not at war, the British seized 528 merchant ships it deemed to be in violation of its own unilateral restrictions. France seized 389 merchant ships as well. When Great Britain's Royal Navy began to stop U.S. warships and remove sailors declared to be British subjects for their own service, the result was the War of 1812. The role of the Navy to protect the American economy as well as to defend its territory was reflected in banners that flew from U.S. warships going into battle against the Royal Navy proclaiming “Free Trade and Sailors' Rights.”

Clearly the U.S. Navy alone is not responsible for America's economic prosperity. Our prosperity is the result of the entrepreneurship, diligence, innovation and dedication of all Americans, working in their own self interest as well as for the greater good. But as previously discussed, the Navy is responsible today as in the past for ensuring that the economic lifelines of international trade remain open to support and fuel that prosperity.

The point of emphasizing this U.S. Navy role—made both possible and necessary by the economic characteristics of the maritime environment—is to identify a uniqueness that is not shared by other forms of military power. The Navy has a critical and direct role in ensuring the protection of the American economy, as well as its citizens.

This responsibility, specific to our Navy, is often overlooked by both the public and defense analysts because, since 1945, it has become expected and perhaps taken for granted. However, any full analysis of the value of the U.S. Navy to the Nation would logically include its role as the protector of prosperity.



## Political Characteristics of the Maritime Environment

While we have discussed the concept of “Freedom of the Seas” as a fundamental principle for a healthy international economy, we should recognize that economic and political characteristics are largely intertwined. Sometimes we choose to use the seas for purely political purposes.

All land areas on the globe are under the sovereignty of a state. U.S. military land and land-based air forces cannot be easily stationed outside the territory of the United States without the permission of the government of a host nation.

The host nation is sovereign within its own territory and has absolute control over where, when and how U.S. forces can be stationed within its territory. Allies of the United States generally allow U.S. forces to be stationed within their territories to supplement their own defenses and ensure close cooperation and interoperability. But even allies may pose restrictions as to when and how U.S. forces can be actively utilized. As an example, Turkey, a NATO ally with long-standing agreements concerning the stationing of U.S. forces, initially refused to allow the projection of those forces from Turkey into Iraq for combat operations.

In carrying out air strikes against Libya following its state-sponsored terrorist attacks in the 1980s, U.S. strike aircraft based in the United Kingdom had to fly around French airspace, adding time and distance to their missions. In order to retain basing rights--or in the case of France, good political relations--the U.S. government had to acquiesce to these restrictions--which initially hampered those operations.

In contrast, sovereignty is not an issue on the high seas outside 12 nautical miles (nm) from shore, the recognized international limit of territorial seas. Activities affecting natural resources or protection of the environment within the 200 nm economic exclusion zones (EEZs) recognized by the Law of the Sea Convention may be restricted by cognizant nations for purposes of resource exploitation and

environmental protection.

However, EEZs do not expand the sovereign control of the water column or ocean’s surface and air above, and do not constrain the transit of vessels or conduct of military training and exercises. Thus, the oceans constitute a political environment without national sovereignty that allows the transit and stationing of U.S. Navy forces without requiring the approval of any other nation. (There are some long-standing treaty restrictions that apply to certain passages; such as the types of warships that may enter the Black Sea.)

This allows the U.S. to deploy naval forces to forward positions. It gives us the ability to station naval forces near potential conflict areas of the world. Through most of our history this has helped to protect the American homeland from direct conflict, even as it has allowed the U.S. to project military power into regions of crises.



*Black Sea Operations: USS Donald Cook (DDG-75) and USS Taylor (FFG-50) operate with warships of NATO-member Romania in the Black Sea, a recent region of potential crisis, 23 April 2014.*

## Use of the Commons and Power Projection

The political characteristics of the maritime environment allow our naval and joint forces the freedom to use the sea as a base of operations. Under international law, warships are sovereign entities of their flag nation. In effect, U.S. naval vessels extend the reach of American sovereign territory into the vastness of the oceans.

Use of the maritime commons allows for positioning of U.S. armed forces without the need to rely on regional land bases under the sovereignty of other nations. Combining the political characteristics of the maritime environment with our capabilities to make good use of these characteristics enables the Navy to provide all domain access for joint force power projection, even when land bases are not available in the region of conflict. Such power projection, commonly defined as the ability to mount expeditionary operations in areas far distant from one’s own territory, is essential to our national interests and national military strategy.

While modern use of the term “commons” includes space and cyberspace as well as oceans, it is the maritime common in which the U.S. is most dominant. Ultimately this is due to the capabilities of our Navy and its capacity to use the political characteristics of the maritime environment.

### *Economic Characteristics of the Maritime Environment*

- Connective tissue of the global economy
- Trade provided motivation for seafaring
- 90 percent of international trade travels by sea (measured in weight and volume)
- Primary method of transporting raw materials, including oil
- Naval forces act as guarantors of access to overseas materials and markets
- Protection of trade (merchant ships) is a historical mission of navies
- Sea functions as a “great common” under “freedom of the seas”





## Rapid Response

Freedom of the seas permits the Navy to maintain forward presence—routine deployments that provide for deterrence and crisis response. Forward presence has been considered a strategic purpose of the U.S. Navy since World War II. It has also played a significant role in positioning our forces so they can ensure the legal freedom of navigation through straits, archipelagic waters (high seas with a ring of islands), choke points, and international waters unlawfully claimed by nearby nations. U.S. naval forces are designed for combat, not specifically for forward presence; however, by being capable of multi-mission combat operations, our forward deployments are much more than “showing the flag.”

While the opportunity for rapid crisis response can also be traced to the political characteristics of the maritime environment, the means of response obviously resides in the strength and capabilities of naval and joint forces. What must be noted is that without the political characteristics—most notably the freedom of the seas principle—it would be more difficult for U.S. forces to be positioned so that they can respond rapidly with sustained force, or in cases of humanitarian assistance, with sustained support.

Sustaining force or support requires a Fleet built to operate for long periods at sea with minimum need for shore-based logistics. This is how the U.S. fleet is constructed. The ability to be forward deployed for six months or longer is a design requirement of U.S. warships. This takes us full circle back to our discussion of the effects of the physical environment, and reemphasizes how the physical, economic and political characteristics of the maritime environment are tightly connected, with the latter two a consequence—at least in part—of the first.

## Freedom of Navigation and International Law



*Interference in international seas: Chinese trawler harasses USNS Impeccable (T-OS-23) while conducting routine survey operations 75 miles south of Hainan Island, 8 March 2009.*

A major aspect of ensuring freedom of the seas is the routine Freedom of Navigation (FON) operations conducted by U.S. naval forces. In defiance of international law, a number of nations attempt to place restrictions on the use of the high seas in the vicinity of their territorial waters. Other states claim ownership of internationally-recognized straits through which much of the world's maritime commerce passes. To ensure the recognition of the international law that supports the political and economic environments, Naval vessels and aircraft routinely

transit and operate within these claimed waters, usually as part of scheduled

deployments. This is done to preserve the rights, freedoms and use of the sea guaranteed to all nations, and is illustrative of the necessary role of naval forces in maintaining a stable political—and economic—international environment.

## Littorals as Population, Economic and Political Centers

Continuing trends in human population growth promise to make the littoral regions even more important in the future. One of the significant features of the recent trend in globalization is increased urbanization.

This urbanization that is occurring is in coastal regions, not in the interior of continents. The fact that over 60 percent of human population today lives within the littoral region and is within the reach of forward deployed U.S. naval forces was identified earlier. Recent studies have indicated that this figure might increase to 80 percent in this century. These are dynamic regions, “melting pots” of ideas, goals, innovation, and in many cases, differing cultures. Ever greater numbers of people in developing countries such as China and India are moving to the coastal cities where there are higher-paying jobs and a higher standard of living.

With the shift of economic growth to the littorals also comes a shift in political power. For democratic countries, this occurs through the voting power of shifting populations. But even in authoritarian countries, political influence tends to follow economic strength.

The flexibility of influencing and protecting the littorals has always been an attribute of naval forces, now greatly enhanced by technological developments that are increasing the range and strength of these attributes. It must be remembered that naval forces operate in all domains and are able to influence the littorals in a wide range of methods, not just kinetic means. The increase of our reach into the littorals simply increases the importance of the Navy's roles. These roles are



*Projecting naval power into a land-locked country: F/A-18C Hornet from Strike Fighter Squadron (VFA) 83 operates over Afghanistan in support of Operation Enduring Freedom, 7 October 2012.*



not just military, focused on the potential use of force, but are diplomatic as well. In fact, studies of naval forward presence suggest that the diplomatic effects have reduced tensions and enhanced stability in a number of contested regions.

A focus on the littorals does not imply that naval forces are unable to influence or strike threats located in land-locked countries and regions far from the littorals.

The U.S. Navy has certainly demonstrated these capabilities in Afghanistan and elsewhere.

In the removal of the Taliban from power in Afghanistan, naval aircraft operating from carriers in the Indian Ocean conducted over 70 percent of joint force combat sorties.

### Humanitarian Assistance and the Political Environment

Another stabilizing force in the political environments is the use of naval forces for humanitarian assistance and disaster relief in regions of crisis. It is natural for naval forces to be involved since so much of the world's population is migrating to the littoral regions. The mobility of naval forces—again, enabled by the physical environment and freedom of the sea—allows for the most efficient transfer of large amounts of medical supplies, water and food, as well as providing naval personnel with skills needed in disasters: doctors and medical corpsmen, civil engineers, logistics managers, and security personnel. Navy combat assets, such as helicopters and landing craft, can also be used in rescue and relief actions. Chapter 3 will discuss some of the details of several historic humanitarian assistance operations.

Such humanitarian assistance can be provided rapidly from the sea because of the routine deployments and forward presence of U.S. naval forces, permitted under international law, which in turn maintains the effectiveness of the law.

This too is a part of the maritime political environment.

#### *Political Characteristics of the Maritime Environment*

- Customary Law of the Sea (LOS) provides rights of ships, delineates high seas from territorial seas
- Warships are sovereign territory of their nation wherever they operate in accordance with LOS
- Freedom of navigation must be demonstrated against unlawful claims
- Sea provides a base for power projection, forward presence and crisis response
- Littorals are population, economic and political centers
- Operating forward, navies have considerable political influence and deterrent effects and can provide humanitarian assistance

### Operational Requirements of the Environment

Thus far we have focused on the strategic advantages of navies derived from economic and political characteristics of the maritime environment. We have also identified some of the operational advantages of navies over other types of military force. Likewise, the extra requirements—potential operational disadvantages as they might be called—caused by the physical characteristics of the environment have been described. It is now important to further discuss the requirements for being able to conduct military operations at sea.

As noted, while the sea affords us opportunities for rapid movement of large cargoes, the physical characteristics of the sea also shape and limit the size, structure, internal volume, and available space of naval warships. Yet, the vastness of the maritime environment and the forward missions of our Navy require platforms to be largely self-supporting in terms of unit logistics (supplies) and immediate repair.

Although the current logistics chain supporting deployed forces is extensive and as efficient as possible, and some repair facilities may be accessible in allied and partner nations, the nature of naval combat and the need to transit and remain at readiness while at sea are challenging requirements. While our operations call for minimal “footprints” ashore, this does not mean no foreign base support for U.S. naval operations. Some host nations, such as Japan, Singapore and Bahrain have proven critical in supporting our forward deployed operations. However, we strive for minimal impact on local conditions. This requires tremendous dedication on the part of our crews.

It also calls for innovation in continuing to increase the self-sufficiency and combat readiness.

### Innovation and Operations Across Mediums

Innovation is a natural requirement when working in the maritime environment. This is apparent when one recalls that naval operations are conducted across multiple mediums: undersea, sea surface, air, space, cyberspace and the littorals. Within these mediums, naval platforms must conduct multiple tasks and missions, often simultaneously. The surface warfare community once coined the expression “up, down and out” to describe the need for warships to be able to engage the enemy in the air and under the sea, and to strike targets at long ranges at the same time. All naval units must be capable of operating up, down and out.

This is dependent on continuous innovation. To this we add operations in the electromagnetic domain, notably including cyberspace. Cyberspace has become a growing dimension for war fighting.

A recent term for cross-medium operations is “cross-domain synergy.” Although initially applied to joint forces, this is a concept that also applies to the operations of naval forces as they combine into task groups, task forces and Fleets. The synergy generated between naval units in a single command structure crosses





the spectrum of operation dimensions. The command must operate in multiple domains simultaneously, with each unit contributing its primary and secondary war fighting capabilities.

Initiative, training, and the ability to act independently have been a Navy tradition of necessity because of the vast distance of operations from shore-based command and control, as well as support and logistics organizations. Today, communications and information exchange with shore-based commands may not be as problematic as in the past. But operating forward also means that communications may be jammed, interrupted or limited in bandwidth, particularly under combat conditions. The habit of independent action developed from intensive tactical training, knowledge of operational doctrine, experience at sea, and personal initiative is a Navy tradition that must be maintained.

The characteristics of the maritime environment demand it if we are to maintain the advantages of operating at sea.

### Conclusion: Effects of Maritime Characteristics

Tracing the characteristics of the maritime environment has allowed us to identify both operational challenges and strategic advantages. The physical characteristics shape the design and capabilities of warships and require that Navy leaders be mariners as well as war fighters. The forces of nature encountered at sea dwarf those of even our most powerful weapons. The range of knowledge and experience required is huge, requiring close cooperation by crews and dedicated and constant effort by all Navy personnel.

The economic characteristics derive from the physical characteristics, resulting in international seaborne trade, the safeguarding of which, in itself, argues for the maintenance of our Navy. The U.S. Navy is therefore a safeguard of U.S. and international economic prosperity as well as territorial defense, assuring access to international material and markets. It has been the policy of the U.S. to support free international trade, giving the U.S. Navy an indispensable role in global economics stability. This role tends to be underappreciated in times of apparent peace. However, maintenance of U.S. trade and the suppression of that of enemies have been a key historic wartime role of naval forces.

Economic and political characteristics of the oceans revolve around the principle of “Freedom of the Seas.” This provides the international political conditions that permit forward naval deployments close to regions of potential conflict without infringing national sovereignty.

The ability of the U.S. Navy to perform this mission with great effectiveness and strength is the basis for unparalleled U.S. joint force power projection, an ability many consider the most significant aspect of America’s defense posture.

Forward deployment allows for the protection of allies and partner nations in an unobtrusive fashion, taking advantage of the sea as a vast space for operational maneuver. At the same time, a naval force can operate across the entire range of global commons and operational domains, creating its own synergy as a multi-

dimensional fighting force.

Naval forces possess strategic advantages that may not be available through the use of other forms of military force. The characteristics of the maritime environment, combined with the U.S. Navy’s capacity for using them, give our naval forces the ability of assuring the access of joint forces into regions of combat, just as it ensures U.S. access to markets and sources of materials on which our prosperity depends.

Despite our advances in technology, life on our planet continues to revolve around the oceans, and the role of our Navy remains most critical to America’s defense, prosperity and international influence.

The Navy’s attributes must support this role today and into the future. These attributes are shaped by and must be optimized for the environments in which we serve.

#### *Effects of Maritime Characteristics*

- Presents operational challenges
- Creates strategic advantages
- Provides a “great common” under international law
- Facilitates economic prosperity (but this needs to be safeguarded)
- Facilitates political relationships
- Allows for the positioning of U.S. forces to deter conflict
- Allows for rapid response to humanitarian crises
- Provides base for power projection
- Affects all dimensions and domains of war fighting



## Attributes of U.S. Navy Forces

War fighting in the maritime environment and its associated domains requires navy forces to possess exceptional attributes in order to prevail. We share many of these attributes with the other Armed Services of the United States. Others are demanded by our natural operating environment, and in that sense are unique to the Navy. Whether common or unique, it is important to identify these attributes in order to understand the critical link between the maritime environment that necessitates and shapes them and the actions and procedures that characterize how we fight. In the previous chapter we described the maritime environment and began our discussion on the factors that affect navy operations. Now we will more fully describe the attributes of U.S. naval forces and how the maritime environment shapes them.

In crises and emergencies, actions are based on behaviors reinforced by training and experience. We train to fight effectively, and—as a perpetual adage says—we fight as we are trained. The underlying behaviors we seek to understand can be traced back to the basic successful attributes of our Navy Service. These basic attributes can in turn be traced to the rigors and necessities of functioning in the maritime environment and its attending characteristics. To understand how we fight requires an examination of the attributes we bring into combat. In this chapter, we will describe these attributes from the keel up, beginning with the necessary attributes of the individual sailor and culminating with the attributes of the Fleet.

### Navy Combat Characteristics: The Threat Environment

To fully understand the attributes of our navy forces we must introduce a fourth category to our characteristics of the maritime environment—the characteristics of naval combat, often referred to in defense publications as the “threat environment.”

The threat or combat characteristics within the maritime environment have features that parallel those of the physical environment: a mix of the predictable and the unpredictable; periods of sudden violence interspersed among periods of calm; a combination of short and long-range perils; and constant elements of risk in every activity. A threat such as an enemy fleet can be somewhat predictable in the sense that we can routinely acquire and analyze all possible information concerning the ships, aircraft, weapon systems, doctrine and training of potentially hostile forces—of both nations and armed non-state groups. Analyzing these factors, we can develop an understanding of their likely strategy and tactics. However, we certainly cannot predict their every action in combat any more than we can predict every aspect of the weather in the physical environment. But like weather forecasting, in which we can develop an accurate picture of general weather trends and probable changes, we can also forecast the outlines of possible conflict.

As an example, we did not forecast with precision that the Japanese Empire would begin World War II in the Pacific with an attack on Pearl Harbor on 7 December 1941. But the U.S. Navy had long studied the Imperial Japanese Navy and knew



## Attributes of U.S. Navy Forces



what threats we would face if such a war occurred. This knowledge enabled us to construct a strategy for victory. Fleet Admiral Nimitz once remarked that we had studied Imperial Japanese forces so thoroughly that the only tactic we did not expect was their use of kamikazes.

Thus, the threat environment must be added to the physical, economic, and political characteristics of the maritime environment, if we are to understand how the historical and current attributes of U.S. navy forces have been shaped.



World War II USS Bunker Hill (CV-17) struck by two kamikazes within 30 seconds during Battle of Okinawa, 11 May 1945. Through the heroic efforts of her crew she was saved and steamed to Bremerton Naval Shipyard for repair. With great resilience she was operating in the Pacific again in September 1945, although the war had come to a close.

### Factors Shaping Attributes of the U.S. Navy

Maritime Environments (Physical, Economic, and Political)

+ Threat Environment

### Attributes of the Individual Sailor: Core Values and Initiative

In the first chapter, we discussed the fact that no sailor acts alone. That remains even more so when we have to fight. Yet, to be an effective member of a crew, the sailor must possess personal characteristics—we can call them virtues or values—that spark the individual actions necessary for the success of the entire organization. It is the responsibility of all navy leaders to inspire and direct such actions if we are to effectively achieve our missions. It is upon these action-

causing individual characteristics that successful navy war fighting is founded.

First are our core values of *honor*, *courage* and *commitment*. These innate characteristics are the keel upon which all the attributes of individual navy ships and units—indeed, those of the entire Naval Service—are built. These core values are embodied in the Sailor's Creed and United States Navy Ethos. They are ultimately the source of our power as the world's foremost navy.



Sailors of Honors and Ceremonial Guard hold the flag during the burial honors ceremony for Pearl Harbor survivor Motor Machinist's Mate 3rd Class Wesley E. Ford, U.S. Navy, at the USS Utah Memorial on Ford Island, Hawaii, 9 July 2014. MM3 Ford served aboard the destroyer minelayer USS Breese (DD 122) during the 7 December 1941 Japanese attack.

A value complementary to the three core values is trust. Sailors must trust that others in the crew will perform their tasks and stand their watches to the best of their ability. The captain must trust the crew and the crew must have trust in the captain's skill and decision making. Trust is the operational face of the value of honor, and is an essential requirement for survival in the maritime environment, especially in combat. Like our organization and operational focus, these core values have roots in the environment. To have effect, they must be applied to real life situations within that environment. They must—and have throughout history—be brought into action. In action, the sailors of the U.S. Navy have always embodied a combination of faithful execution of lawful orders with *great personal initiative* in the absence of orders or when direction is unclear, fragmented, or unavailable. It has often been remarked that it is this sense of personal initiative that has always distinguished U.S. sailors. Some of this personal attribute is a result of living in a democratic nation in which all citizens are free to make their own choices on how to live and how to be governed. A productive life in such a society requires initiative. This natural tendency is reinforced by





## Attributes of the Individual Sailor: Resilience and Self-Reliance

Going hand-in-hand, or shall we say hand-over-hand, is resilience. Resilience is defined as the ability to recover rapidly from change or misfortune. In routine activities at sea with their inherent dangers, simple resilience is reflected in the ability to respond to accidents or damage, effectively correct the situation, and continue the task. All sailors must have a sense of resilience if the crew and warship they are a part of is also to be resilient. Ships are designed for damage control, which is a means of maintaining structural resilience. But the actions necessary to carry out damage control come from resilient sailors. We train to be resilient, but, as we have noted, the resilience must initially come from within each individual.

In combat, this sense of resilience, particularly when under the fire of a hostile force, means the difference between victory and defeat. As a historical example, the U.S. Fleet suffered a crushing blow at Pearl Harbor, but it was resilient enough to rebound back and win the war. The resilience of the Fleet started with the resilience of the individual sailor, supported by contingency plans and doctrine, ship repair capacity of both navy and commercial shipyards, and afloat tenders and repair ships, and a supremely effective logistics network.



*View of damage to the hull of USS Samuel B. Roberts (FFG-58) following the mine attack, 14 April 1988. The photo was taken while in a Persian Gulf dry dock for temporary repairs, 3 May 1988.*

A more recent example of crew resilience is survival of the USS *Samuel B. Roberts* (FFG-58) after it struck a mine on 14 April 1988. *Samuel B. Roberts* had deployed to the Persian Gulf as part of *Operation Earnest Will*, the escort of reflagged Kuwaiti tankers during the Iran-Iraq War. Heading to a refueling rendezvous in waters it had previously transited, the ship spotted three Iranian mines which it avoided.

It subsequently struck a fourth unseen mine that blew a 15-foot (5 m) hole in

a navy culture in which initiative is encouraged, prized and rewarded. Our Navy must always be structured to support individual initiative and each leader must help foster it in his or her sailors. It is only by fostering this individual characteristic that it can be effectively instilled in the commanding officers and crews of warships and other navy units so that they are ready to take the initiative when it matters most, and in the absence of direction by higher command.

Earlier we discussed how the key personal values and attributes are required by the very fact of being at sea. These are the prerequisite attributes that we expect of each sailor upon entry into the U.S. Navy, and we make great efforts during basic training and beyond to reinforce these values. But—like the basic designs of our warships—these personal characteristics are shaped by the maritime environment, shaped by the sea. One cannot master the sea without full commitment.

Psychologists advise that to learn to have courage, one must consciously endeavor to act courageous even when the initial instinct is to show fear. This view suggests that one learns to routinely act courageously by conscious and thoughtful repetition.

Through such conditioning one can acquire the habit of courage. In the face of the challenges of the maritime environment—such dangers as violent storms, the transfer of fuel or handling of ordnance in pitching seas, or other inherently dangerous activities routinely carried out—courage is always needed. It is this habit of courage, developed in facing the hazards of the maritime environment that helps to instill the individual courage needed for battle. In the same way, the habits of honor—symbolically demonstrated by navy customs and traditions; and commitment—a requirement of all successful crew efforts—are reinforced through repetitive experience.



*Sailors of USS Bunker Hill (CG-52) unload supply pallets transferred from USNS Yukon (T-AO-202) while also taking on fuel during and underway replenishment (UNREP), 28 May 2014.*



her hull. In addition to flooding the engine room and displacing the ship's two main engines from their mounts, the blast broke the keel—structural damage that almost always sinks the ship. The crew fought fires and flooding for five hours. They saved the ship by taking exceptional damage control actions such as wrapping cables around the cracked superstructure. Throughout, *Samuel B. Roberts* never lost combat capability; her radars and missile launcher remained on line, and she suffered no fatalities.

Yet another characteristic the Navy endeavors to develop in each sailor is a personal sense of *self-reliance* that makes his or her individual contribution as a member of the crew even more effective. Self-reliance is not about operating independently; it is about having the capability as well as the initiative to take action without having to wait for support or assistance from somewhere else. In order to be self-reliant—within the confines of a hull and superstructure design shaped in part by the characteristics of the maritime environment—warships



*An opportunity for expanding personal knowledge in USS Carl Vinson (CVN-70), 4 January 2010.*

#### *Attributes of the Individual Sailor*

- Core Values
  - Honor
  - Courage
  - Commitment
- Personal Initiative
- Individual Resilience
- Self-Reliance

carry with them as many provisions, repair parts, ordnance, and other logistical material as can be efficiently stored. This is necessitated by the fact that ships and other units continuously deploy to far regions where there are no opportunities for extensive re-provision or outside help. Just as with the ship itself, self-reliance is necessary at the individual, work center, and watch team levels. Teams must operate in mutual support, each sailor providing specialized skills. But a team cannot wait for its reliefs to solve a developing problem. An evolving situation needs to be solved before the situation becomes hazardous. This calls for a degree of foresight that is a fundamental aspect of self-reliance.

Developing robust self-reliance requires making the most of every opportunity for training, experience, and self-improvement. Earlier we wrote of the need to constantly replenish one's knowledge of navy operations and functional expertise. This too requires a degree of self-reliance. You must take the personal initiative to teach yourself using the available references and information. Self-reliance requires personal initiative to expand professional knowledge. That is why the Navy maintains a Chief of Naval Operations Professional Reading list, in addition to numerous training manuals, tactical publications and other professional references such as *The Bluejacket's Manual*, *The Chief Petty Officer's Guide*, *Watch Officer's Guide*, and *Division Officer's Guide*. There is also a wealth of on-line courses and electronic learning opportunities.

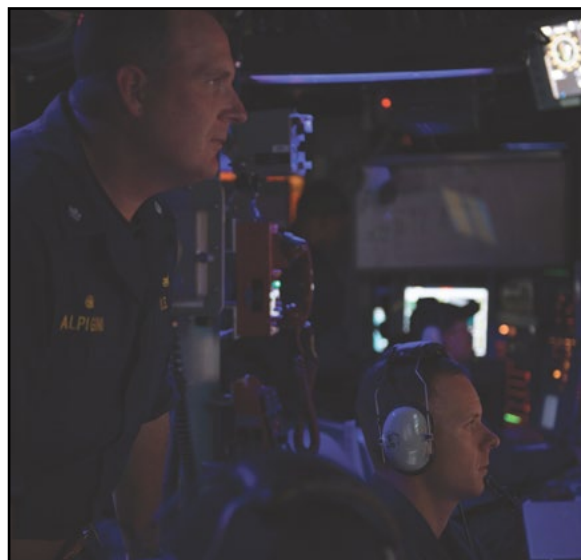
### From Individual Attributes to the Functioning of the Crew

While the necessary attributes of individual sailors are the framework, the proper functioning of a crew must begin with collective adherence to core values. This is where the mutual trust necessary for maximum performance in danger and combat begins. Reinforcing this trust are extensive exercises to which every navy unit is subjected. Along with internal training and evaluations, such exercises require the team to practice and demonstrate its highest peacetime performance. In combat, this trust must be absolute. Commonly accepted and practiced core values are the keel of absolute trust.

Like individual initiative, the crew must demonstrate collective initiative. No command can achieve operational success without a crew with initiative. In fact, our war fighting doctrine is predicated on it. Perhaps the most dramatic illustration of that is the operation of a ship's Combat Information Center (CIC) or Combat Direction Center (CDC). While sitting in "Combat" during General Quarters, the Commanding Officer cannot and does not direct the myriad of simultaneous activities involving weapons engagements in multiple dimensions. It is the Tactical Action Officer (TAO)—with weapons release authority from the CO who directs the overall war fighting activity. Under the TAO, actual engagements in specific dimensions—air, surface, undersea, the electronic spectrum, or even space—are directed by officers, chief petty officers, or petty officers assigned to specialized tasks: the (missile)



fire control officer, anti-submarine warfare evaluator, and electronic warfare supervisor are but three examples. All personnel take action in accordance with their training, standardized procedures and rules of engagement, and appropriate preplanned responses. The TAO prioritizes the activities and gives the action order to fire. Meanwhile—in accordance with our doctrine—the CO's role is to maintain command of the overall situation and command by negation, that is, to stop the release of weapons or otherwise correct and redirect the TAO if the CO concludes that another solution should be used. In this fashion, the CO has the opportunity to concentrate on the integration of all the ship's actions, whether in Combat, on the Bridge, in the Engineering Central Station, Damage Control Central, or at weapons stations—in other words, to see the “bigger picture” and role of the ship as a unit of the task group or fleet. Without such a doctrine, the speed of events in modern day warfare demands a span of attention to detail too great for any one human, even the CO.



*Command by negation is the doctrine in which Sailors conduct their war fighting tasks as training without awaiting specific commands unless the commanding officer specifies another course of action. Commanding officer of USS Stout (DDG-55) monitors a ballistic missile defense exercise in the ship's combat information center (CIC), 8 January 2014.*

This requirement to delegate activities and responsibilities cannot succeed without initiative on the part of each watch stander and participant. No member of the crew can simply wait for “orders from above.” All must take decisive action.

A crew member who spots danger—a fire or flooding, as examples--cannot simply report its existence to Damage Control Central, he or she must also take whatever

immediate actions are possible to stop it. This requires initiative throughout the crew, and as a crew.

Just as with initiative, individual resilience also sums to a resilient crew, one that will not give up its efforts when faced with difficulty or danger. A resilient crew rebounds from setbacks and uses its collective initiative to find (whether in hours or seconds) new methods for accomplishing the mission. Self-reliance for the crew is the sum of the individual self reliance of every crewmember. U.S. warships operate forward for long periods of time; they are expected to be able to operate independently, away from sources of supply or repair, and in a hostile physical environment. Ultimately, the ship can rely only on itself and the other ships in its operational task group. There will always be limits to the logistics it can carry. But the crew and warship must be self-reliant to its utmost in order to survive, let alone complete the mission. In a very real sense, there is no choice except to be self-reliant. There is nowhere to escape from everyday dangers, such as fire or flooding or from hostile actions. The crew must continue to “fight the ship” as well as control the damage from enemy action, and have the self-reliance to perform and succeed. As Professor Wayne Hughes of the Naval Postgraduate School describes battle at sea: “No place to hide in ships: where the captain fights, you fight.”

#### *Attributes of an Effective Crew*

- Collective Adherence to Core Values
- Mutual Trust and Respect
- Cooperative Initiative
- Collective Resilience
- Collective Self-Reliance
- Respect for Authority

#### **From the Attributes of the Crew to the Attributes of the Warship**

Warships are designed to accomplish specified missions and survive in the maritime environment. They are also designed with the attributes that we have discussed in mind. A good warship design both facilitates and requires the crew to be self-reliant, resilient and show initiative. The systems within the hull are complex. As hard as we try to include automatic and time and labor-saving devices into these systems, they still must be operated by the crew. Decision-making in naval combat is too complex to be performed entirely by machines, even the most advanced computers with artificial intelligence. The crew and the command structure--with command by negation--are the decision-making intelligence of a warship.

As a counterpart to the crew's ability to take initiative, a warship must be





designed to ensure *flexibility accomplishing its missions*. Over its 30 to 50-year lifespan, a warship will be called upon to complete tasks and missions its designers may have never envisioned. Each ship, based on its original planned use, has specific mission-related requirements that affect its design capabilities. Most warships are designed with some degree of multi-mission capabilities. They are capable of conducting simultaneous multi-dimensional combat and a wide variety of peacetime missions.

Warships have and will be used in unanticipated and improvisational ways.

Operating airplanes from cruisers at the advent of taking aviation to sea, or operating U.S. Army helicopters and stability teams from aircraft carriers, as was done during *Operation Uphold Democracy*, the U.S. military intervention in Haiti in 1994, are but two examples. There are many more, with increasing numbers after the end of the Cold War.



*Marines offload from Navy Landing Craft Air Cushion (LCAC) During Operation Uphold Democracy at Cap Haitien, Haiti , 29 September 1994.*

Navy warships are designed to accommodate both *changes in mission and changes in configuration*. As navy technology advances, new weapons and other systems will emerge to improve navy war fighting capabilities. Warships must be designed with the engineering margins and design flexibility to maintain mission capabilities over a long service life.

Recently, the Navy took innovative steps in the use of modularity in warship design to give certain ship classes the capability to completely replace mission packages. However, whether referred to as being modular, or not, all warships are designed with the attribute of flexibility.

*Resilience* is another attribute of U.S. Navy warship design. American warships are designed to take battle damage that would incapacitate commercial ships, and, indeed, many of the naval combatants of other nations. Compartmentation,

redundancy and separation of mission essential systems, damage control systems, and shock-hardening are but some of the unique features that contribute to operational resilience. In the area of logistics, resiliency is maintained by the world's most extensive fleet of navy at-sea replenishment and resupply vessels.

The U.S. Navy does not maintain "one shot and done" combatants. American naval operational doctrine is based on the assumption of a high degree of resilience in all forces; it is a design attribute of our warships which we rely upon.

### *Attributes of Combat-Effective Warships*

- Facilitates Effective Crew Decision-Making and Action
- Flexibility to Complete Unanticipated Missions
- Accommodates Changes in Weapon Systems and Capabilities
- Designed for Resilience

### **Tactical Attributes of Naval Forces**

The mutually supporting and cumulative attributes of the individual sailor, crew and warship generate tactical attributes that enhance the flexibility, combat power, and operational effectiveness of U.S. naval forces. The combat capabilities of U.S. Navy forces are extensive and to fully describe them would require extensive volumes. Here we will briefly discuss a few of the key tactical attributes common to U.S. warships when operated together as task groups, forces or fleets.

One tactical attribute, derived directly from our philosophy of warship design and tactical networking, is *the ability to operate as a concentrated force or to operate equally effectively when dispersed*. Sensors, communications and information processing capabilities, strike and self-protection by means of missiles, guns, decoys, and electronic warfare systems, and logistical self-reliance allow individual warships and other navy units to operate independently and complete tasks that do not require the efforts of a combined force. At the same time, these individual task units can remain networked together to maintain a common operating picture or to quickly revert to combined operational control. Networking has been an attribute of navies since the first use of simple visual communications such as signal flags.

The evolving sophistication of navy communications has continuously increased this networking capability, often with considerable spill-over effects to the civilian world. It was the U.S. Navy's experimentation with ship-to-ship and ship-to-shore radio communications during the early 1900s that directly led to the development of the commercial radio broadcast industry.

*Networking* allows navy forces to be operated in an aggregated or disaggregated manner, greatly enhancing the options available for an operational commander, as well as allowing for the coordinated, perhaps simultaneous application of navy



power over long distances and in multiple regions. Task groups and forces can be reconfigured by the inclusion of new units or the release of existing units in order to ensure optimal configurations for assigned tasks and missions. A recent term used to describe this feature is “scalability.” A naval group can be scaled to the particular task assigned; the ship types and numbers necessary for counter-piracy operations will be different from those for an amphibious operation. Scalability has been an attribute of our naval forces for years. It stems from individual ship designs and the necessities of the environment.

Another tactical attribute is the *ability for dispersed platforms to operate a wide-ranging network and concentrate naval fires* (kinetic strikes). Concentrated fire from multiple axes and domains is an attribute that is difficult to replicate by the use of other types of military forces. Naval fires are also unique in that they can be concentrated in any domain from outside that domain. For example, sustained attacks can be made on undersea targets from multiple units, concentrating fire from undersea (submarines), surface (surface ships), and air (ASW aircraft). A strike against shore targets from the sea can also be conducted simultaneously from all these dimensions, supported and enhanced by the use of electro-magnetic spectrum capabilities, cyber warfare, and information from space-based sensors and systems. This ability to concentrate fires from multiple domains is an attribute of navy forces that is critical to joint operations.

In joint doctrine, operational maneuver has often been portrayed as a counter-pole to concentrated fires. For a number of years, “maneuver warfare” was a term used to describe a “new” tenet of military operations that sought to avoid “attrition warfare”. However, wide-ranging maneuver has always been a natural attribute of navy forces. The sea both enables maneuver and requires us to employ it to prevail in combat. *Naval fires and naval maneuver* are complementary attributes.

In naval warfare, maneuver is an attribute that can enable the *concentration*

*of fires*, if necessary, or the detachment and dispersal of forces as determined by the operational commander. The use of the sea as a maneuver space provides navy forces with tremendous tactical and strategic advantages. The mobility and reach of modern naval forces, equipped with advanced strike/naval fires and amphibious capabilities, translate into an ability to attack (and defend positions) anywhere in the littorals. The enemy is left to wonder where our navy forces will strike, forced to both defend the length of his coastline and spread his forces too thin, or concentrate his force in what it considers critical areas, leaving other areas lightly defended. Employing conditions of the maritime environment to create “confusion of the enemy” and “over-commitment of enemy resources” are not in themselves unique to navy operations; but they are representative results of our navy attributes. These attributes in turn contribute to the strategic attribute of assured access.



*Defense in depth: Firing of NATO Sea Sparrow missile, providing mid-range self-protection capability.*



*Kinetic fire: USS Antietam (CG-54) conducts a live fire exercise in the waters west of the Korean peninsula, 23 July 2014.*

Another operational attribute of naval forces might be called “cooperative protection.” This is not a doctrinal term, but appropriately describes the long-standing defense-in-depth approach that the U.S. Navy has employed for combat operations. The maneuverability inherent at sea facilitates this approach.

Historically, navy defense-in-depth in task group, force, or fleet operations has centered on the protection of a “high value unit,” usually the most powerful offensive strike platform such as an aircraft carrier. This concept originated before World War II, but became the standard at-sea formations typifying that conflict.

Other—generally smaller and more numerous—classes of warships would be assigned in operating zones or concentric rings around the high value units to provide the defense-in-depth. Such formations also facilitated the mutual self protection of all the ship in formation. With the great advances in navy technology





since that war—particularly in the range and destructiveness of modern weapons and the high level of networking—cooperative protection is less dependent on concentration of forces. However, it remains a routine attribute of operations, facilitated by ship design, operational doctrine, training and experience, and ultimately, the abilities of the crews.

At the tactical level, the term sustainment is an appropriate combination of the attributes of resilience and self-reliance. Sustainment has been defined as “the delivery of tailored support and logistics across the spectrum of conflict from the sea.” In light of the need to support the attributes previously discussed, such as the ability to operate forces dispersed over far distances, sustainment could also be described as an operational attribute. As noted, the attributes of navy forces are always mutually supportive, integrated, and cumulative in effect.

Another critical navy tactical attribute is *persistent operational stealth*. In recent years, stealth has been most often associated with the characteristics of the radar evading properties of fourth- and fifth-generation combat aircraft. This type of stealth was initially demonstrated in combat in *Operation Desert Storm* in 1991. But our Navy’s submarine force has long been the primary practitioners of operational stealth in the U.S. armed forces. This was true even in the era before nuclear propulsion, although nuclear propulsion increased the stealth characteristic of submarines multifold. These stealth characteristics are derived directly from the undersea environment, whose physical properties frustrate most forms of observation. As the ultimate stealth force, ballistic missile submarines are considered the most survivable leg of the U.S. nuclear triad, while attack submarines armed with cruise-missiles or carrying special operations forces can approach hostile shores submerged and minimal chance of detection, and operate there for months on end. This persistent stealth is a natural attribute of the U.S. Navy’s ability to operate in the maritime environment.

#### *Tactical Attributes of U.S. Naval Forces*

- Ability to Concentrate Force
- Ability for Independent Unit Operations
- Continuous Networking of All Operational Units
- Scalability to Task
- Far-Ranging Operational Maneuver
- Concentration of Fires from Dispersed Platforms
- Cooperative Protection
- Sustainment at Sea
- Persistent Operational Stealth

#### *Strategic Attributes of the U.S. Navy*

As we have discussed, the link between global freedom of the seas and foreign and economic policy has been a driving force in modern world history. Moreover, *protection of economic trade* and *protection of our access to the great oceanic common* can be considered the defining strategic attributes of U.S. navy forces.

They require the maintenance of a powerful U.S. Navy in peacetime and wartime to maintain them.

Another strategic attribute is in the unique way in which the U.S. Navy provides for *defense of the American homeland*. Since 1814, the U.S. homeland, unlike many nations of the world, has not suffered a military invasion. This has been due in a great measure to the fact that we have been separated by two oceans from our most powerful enemies. It is the maintenance of a powerful Navy capable of defeating the transit of any overseas invasion force that has preserved the physical sanctuary that the American people enjoy. Such defense might paradoxically be called “distant homeland security.” The term homeland security has not been popularly associated with the Navy and Marine Corps; instead, the U.S. Coast Guard has been assigned that role. Nevertheless, navy forces operating from homeports and airfields are assignable to the military homeland security mission of U.S. Northern Command, the combatant commander charged with that responsibility. Moreover, functioning as the Nation’s “away team” on forward deployment, navy forces also act as the leading edge of our overall homeland security, preventing and deterring the transoceanic movement of hostile military forces. In the final analysis, adversaries attempting to get to our homeland have to go through our Navy.

Over the years, the U.S. Navy has examined and codified the strategic concepts that describe its primary missions. Today they are also called “essential functions” and “core competencies.” In the 1970s, four war fighting-related missions were postulated as representing the capabilities that the U.S. Navy provided the Nation that satisfy national security requirements: (1) sea control, (2) power projection, (3) strategic deterrence, and (4) maritime security (previously described as forward



*Homeland defense does not begin at home: Between forward deployment USS Oak Hill (LSD-51) passes the Statue of Liberty to participate in Fleet Week in New York City, 21 May 2014.*





presence), to which (5) all domain access (sometimes referred to as assured access) has been added. All are enabled by the tactical attributes of our naval forces and derive from mastery of the maritime environment. In the following discussion, we will describe them in terms of attributes. In Chapter 4, we will discuss them in terms of operational missions.

Once again we see the linkage between mission, requirements, threats, attributes, and the maritime environment, all of which—as we said at the outset—are highly inter-related. The maritime environment shapes how a navy must operate to be an effective combatant force; the potential threats determine the specific war fighting capabilities that the Navy must develop. They also affect the application of the attributes. National requirements dictate the overall military and political strategy the United States will pursue to deter, neutralize, or combat existential threats. Naval strategic concepts describe the missions the Navy will pursue to fulfill the national strategy, given our understanding of the characteristics of the maritime environment, our navy force attributes, and the nature of the potential threats.

### Ability to Operate Forward

In the 20<sup>th</sup> century, the concept of “forward presence” was described as one of the Navy’s four strategic missions. Our navy forces have been maintaining forward presence since the end of World War II, largely because of a major lesson learned from the outbreak of that war: without a visible appearance of readiness and commitment, wars are less likely to be deterred. The term “forward presence” describes the political, economic and military effects of routinely deploying and maintaining navy forces in overseas regions of importance or potential crisis.

Recently we have recognized that instead of being a mission, forward presence is actually a strategic attribute of the U.S. Navy, enabled by the characteristics of the maritime environment and achieved through our mastery of that environment via our ship designs and navy force construct. In fact, forward presence is one of our most critical strategic attributes because it is a primary basis from which U.S. joint forces can maintain stability or project military power into regions of crisis. It provides a continuing deterrent to the outbreak of such crises—particularly those directed against the United States—by providing a continual, highly visible appearance of U.S. commitment to maintaining peace, stability and freedom of the seas. Forward deployed navy forces are available to respond quickly, require minimal support, and are not restricted in their movements. They are available as diplomatic, political, and economic assets that can influence, persuade or pressure uncooperative governments or non-state actors to choose peaceful means over hostile acts. They possess a *credible and scalable ability to deter potential adversaries from using conventional or unconventional means*. As discussed earlier, their ability to maneuver is largely unfettered by diplomatic complications. With respect to access and presence, navy forces support a wide range of credible deterrence options. To sustain this core capability, navy forces must continue to

develop and put to sea a broad and enduring deterrence portfolio by maintaining nuclear and conventional capability advantages, now including sea-based ballistic missile defense (BMD).

Forward deployed navy forces provide a speed of response to an emerging crisis that is hard to match with our Nation’s other options. It comes from forces that can be immediately employed from within a region, without restrictions, even as we begin to mobilize and deploy other joint forces toward to the point of crisis or conflict. From that timely response, we can often gain tactical surprise. We can deny sanctuary to a potential adversary by controlling the littorals, and not allow them to be neither a barrier nor a refuge we cede to an enemy.



*Operation Desert Fox: Sailor in USS Enterprise (CVN-65) paints bomb icons on an aircraft to indicate the number of bombing runs completed, 18 December 1998.*

Our navy forces have provided such timely responses on more than 80 occasions since the end of the Cold War, including 11 different combat operations. In the last 15 years, navy carrier strike groups (CSGs) have engaged in combat as part of *Operation Allied Force* in Southeastern Europe as well as *Operations Iraqi Freedom*, *Enduring Freedom*, *New Dawn*, *Odyssey Dawn*, and other operations in Southwest Asia. To cite just one example, during *Operation Desert Fox*, navy forces struck eighty-five different targets over just four nights of combat. These combat operations were conducted by forces on routine forward presence deployments, and those forces continued their routine deployments subsequent to these operations.

Further, because of political concerns by our regional partners, sometimes only navy tactical aviation was allowed to fly from within theater. The routine forward deployment of navy forces provided combat power that was immediately employable and gave no strategic warning which might have come with the movement of new land-based forces into the area.

In the last two decades, navy forces have conducted numerous non-combatant



evacuation operations (NEO), boarded and searched more than 5000 vessels in support of U.S. drug policy and United Nations sanctions, and conducted over 30 humanitarian assistance operations. Although often overlooked by the public, shows of force—conducted at the right time and place—have sent powerful messages to potential foes that deterred or otherwise affected their actions, while sending a message of resolve and reassurance to friends. One example of the combat credibility of forward deployed U.S. navy power to shape events occurred in the Taiwan Straits in 1996. In March 1996, increased tensions between China and Taiwan culminated in Chinese ballistic missile tests in the waters off Taiwan.

In response, the *Independence* CSG—already in the Western Pacific—moved into position off the east coast of Taiwan, and was joined shortly thereafter by the *Nimitz* CSG. This powerful demonstration of U.S. resolve to maintain peace and security in the region was a decisive element in the restoration—the shaping—of political calm in the region. Deterring acts of aggression and reassuring our friends and allies is what makes forward-deployed navy forces indispensable in helping to create a framework of regional security and stability. It is, however, more than sending signals that counts. It is the credibility of this responsive combat power in overseas regions that provides another daily return on the nation's investment: *the power to shape decisions and events*. The ability of our Navy to shape events has become a foremost national asset.

### The Attribute of Nuclear and Complex “Conventional” Deterrence

Deterring nuclear war is a cornerstone of our national security strategy. Credible nuclear deterrence is based on the unquestioned capability of our nation to inflict unacceptable losses on any adversary who uses nuclear weapons to attack the United States or its allies. Although the risk of a global nuclear conflict has diminished substantially since the end of the Cold War, proliferation of nuclear weapons is continuing, and the danger of attack from an unstable, hostile, and irresponsible state or terrorist organization cannot be discounted. Some scholars and analysts believe that a “second nuclear age” centered on the defense postures of certain Asian countries has already begun. Since deterring nuclear attack remains one of our nation's highest defense priorities, we must maintain a credible, highly survivable, sea-based strategic deterrent and response through our continued deployment of nuclear-powered ballistic-missile submarines (SSBNs).

The backbone of the Nation's survivable nuclear deterrent will continue to be provided by the SSBN force and its supporting command and control (C2) architecture for the foreseeable future. SSBNs serve as the ultimate guarantor of a U.S. assured second-strike capability. They are designed specifically to be stealthy—their characteristics taking advantage of the nature of the undersea environment—and the precision delivery of nuclear warheads. As a virtually undetectable and survivable launch platform, SSBNs ensure that the United States

will have sufficient nuclear forces to inflict unacceptable consequences on an adversary in response to a nuclear attack.

The credibility and survivability upon which this deterrence rests is dependent upon robust acoustic and non-acoustic stealth, reliable long-range missiles, and an adaptable employment concept capable of holding adversaries at risk anywhere on the globe.



*Sailors of the Gold Crew of ballistic missile submarine USS Pennsylvania (SSBN-735) return from a 140-day strategic deterrent patrol, 14 June 2014.*

Our Navy also has a deterrence role derived from the strategic attribute of complex conventional (non-nuclear) deterrence. History shows that a strong navy is by nature a “fleet in being” that has considerable deterrent power. But our mission—a national requirement—is to be more than a “fleet in being.” It is to deter aggression toward the U.S., her allies, partner nations, and other peaceful members of the world community, in whatever form that aggression takes. Our Navy acts on a day-to-day basis to influence other states not to take actions contrary to our interests—of which global security is one. Deterrence is the state of mind brought about in a potential enemy by a believable threat of retaliation, the recognition that the action being contemplated cannot succeed, or an understanding that the costs of the action will exceed any possible gain.

A potential aggressor may be reluctant to act for fear of failure or the costs and potential consequences involved. The pre-crisis presence of navy forces or their movements into areas of crisis are two of the strongest deterrent signals we can send. They are unmistakable evidence that a fully combat-capable force stands poised to protect U.S. national interests, and that additional force, however much it takes, will be made available should it be necessary.

Forward presence and interoperability with allied navies and other military forces also contribute to conventional deterrence. A particular issue of the current era is the proliferation of weapons of mass destruction (WMD), including chemical



and biological weapons (CBW). These and other threats (including terrorist use of CBW) directed against U.S., allied, and other friendly nations' interests dictate that the Navy maintains a full array of retaliatory capabilities.

Our nation's willingness to employ its conventional military might against those who may consider employing such weapons remains our primary deterrent to their use. Chemical and biological weapons are so repulsive to world society that most major countries are signatories to international treaties banning the production, storage, and use of such weapons. The United States is a party to these treaties.

Unfortunately, chemical and biological weapons already exist in many countries and they are still proliferating. Our nation's continuing involvement with friends, allies, and potential coalition partners is an attempt to dissuade further proliferation and buildup of these arsenals. Being able to depend on the strength and commitment of the United States, friendly nations should not feel the need to acquire WMD for their own defense. Thus, our continued regional forward presence helps provide such assurance to our allies and partner nations—an important part of our nation's conventional deterrence.

### Power Projection and All Domain Access

Power projection is one of the enduring missions of the U.S. Navy. It has another dimension—one that can be described as a strategic attribute: the *ability to assure the access of joint forces into a region* of conflict. This strategic attribute derives from the nature of the maritime environment and other-level navy attributes.

This strategic attribute is manifested in the strike capabilities of navy forces—naval gunfire support, carrier aircraft, assault capabilities of our amphibious forces, and, more recently, cruise missiles. Our forward deployed posture allows us to act as the leading edge of the overall power projection capabilities of our joint forces. Operating from forward locations, our navy forces may be the decisive force for operations short of major theater war. As previously noted, navy forces can be scaled to *match a particular contingency, allowing the rest of the fleet to conduct other operations*. However, when crisis escalates to war, navy forces can increase their ability to provide critical, early combat power from the sea by *assuring access for the joint force in all operational domains*. All domain access means that we can not only ensure that joint forces can enter, but also maintain their base of operations within a contested region. A more formal definition of all domain access is “the unhindered national use of the global commons and select sovereign territory, waters, airspace and cyberspace, achieved by projecting all the elements of national power.” The enemy's effort to deny access is referred to as anti-access or area denial warfare.

One premise of our national military strategy is that the United States will have immediate and sustained access to any region of the world at any time. Similarly, as previously discussed, our nation's continued economic prosperity depends on the assured commercial access required to maintain the uninterrupted flow of trade through key regions of the world. In the coming decades, we expect

that our access may be challenged by nations that seek to expand their regional influence in ways that compete with the interests of the United States. We believe that they will use their military forces not only as a means to coerce their neighbors but also as instruments to challenge our ability—or the perception of our ability—to remain present forward and provide the access needed. Potential hostile forces could try to impose anti-access or area denial by employing a variety of asymmetrical means to deny our ability to assure access. We anticipate that some of these regional competitors may employ systems such as land-based cruise missiles, mines, advanced conventionally-powered submarines, and increasingly sophisticated space-based satellite targeting. Some may choose to develop ballistic missiles and weapons of mass destruction, coordinating the employment of these systems with an information warfare effort.

Assuring *immediate and sustained access* in the face of these challenges will continue to be critical for the employment of the entire joint force. However, by virtue of their “already being there,” our rotationally deployed navy forces will be the critical enabler for the projection of joint combat power into any area of operations from outside the theater, creating the conditions that ease the access for follow-on forces. All domain access—when combined with the appropriate capabilities—flows from the Navy's ability to freely use the “global commons,” which is, of course, initiated by our mastery of the maritime environment. Thus, assuring access can be seen as an attribute of U.S. navy forces.

Using their stealth attributes, submarines can initially operate as the closest means of intelligence-gathering, surveillance and reconnaissance (ISR). Innovative platforms and systems, such as carrier-based unmanned aerial vehicles (UAVs) and unmanned underwater vehicles (UUVs) deployed from our submarines will extend the range of joint ISR. As joint forces begin to flow into theater, surface combatants must provide a highly mobile, immediately employable means to *project defensive power ashore* in the form of ballistic missile defense (BMD) and area air defense capability, protecting coastal airfields, ports of debarkation and amphibious lodgment areas. These maritime BMD and air defense forces—operating freely from the high seas—also ease the demands on airlift for similar land-based systems in the critical early phases of conflict, enabling a more rapid transition to offensive operations for those follow-on forces.

Our forward deployed navy forces already on station can also provide timely *offensive* power projection—from the carrier air wing, submarines and surface combatants—bringing the firepower from the sea to support joint operations ashore, at least until forces deploying from the United States are firmly established.

These attacks from Navy and Marine Corps units will be critical to the success of the combat operations of a lighter, more expeditionary joint force. All these attributes require considerable national investment in new technologies and routine capability-upgrades for the present fleet. The payoff is the attribute of assured access, on which joint force power projection ultimately depends when faced with a determined enemy in a contested region.





## The Attribute of Sea Control and Area and Battlespace Control

Navy forces simultaneously guarantee the sea control necessary to sustain shore-based forces. In earlier eras, such as when Britain's Royal Navy was the dominant global military force, sea control was referred to as "command of the sea," a term that came to be considered grandiose. Whatever the actual term used, sea control was what navies always sought in war: the ability to prevail in the area of conflict and utilize that sea-space (and airspace) for its own purposes. A more formal definition of sea control would be the ability to dominate sea and air lanes and then to defeat a foe's littoral, sea, air, and related space and cyberspace capabilities throughout a broad theater of operations. Sea control is the opposite of sea denial, which is the lesser ability of preventing one's opponent from using a particular sea space, without an ability to control it for one's own purposes. Some navies are only built for sea denial, not the full sea control mission.

During much of the Cold War, the Soviet Navy was unable to compete with the U.S. Navy and allied navies for sea control. The United States gained tremendous experience with intensive navy war fighting during World War II, and, held particular advantage over all other navies in aircraft carrier and amphibious operations. The Soviet Union, on the other hand, conducted only limited naval operations in that war, and none on the high seas.

Challenging U.S. and allied navies for control the oceans of the world, and particularly the Atlantic, appeared impossible. The Soviet Navy therefore was initially developed as a sea-denial force—one that was designed to destroy enemy ships and aircraft but could not attempt to control sea regions far beyond its coastlines. The Soviet Navy invested in the tools of sea denial: great numbers of

diesel submarines, as well as nuclear subs; land-based long range bombers; anti-ship cruise missiles; and sophisticated naval mines. Later it began to construct ships more suitable for a sea control role, such as short take-off and landing (STOL) aircraft carriers and cruisers, but by that time the Soviet Union was coming closer to its collapse. It never achieved the status of a sea control navy.

*Area control* can be added to the sea control concept to reflect the Navy's ability to project power into littoral land areas (and beyond), as well as the ability to protect forces and populations ashore through such emerging capabilities as naval ballistic missile defense. This is a necessary feature for assuring access. *Battlespace control*—a term frequently used in the literature on joint war fighting—reflects the application of sea and area control (in whatever domain) to combat operations.

*Sea, area and battlespace control* are evident attributes of successful navy forces in war. An example of the need for sea control is the anti-submarine warfare campaign conducted against German U-boats in the North Atlantic during World War II by the Allied navies. Without the establishment of sea control to protect its logistics in the form of convoys, the British could have been "starved" out of the war. The build up and power projection of Allied forces for the final defeat of Nazi Germany in Western Europe could not have occurred.

Operations to establish and maintain sea control may include destruction of enemy naval forces, suppression of enemy commerce, protection of vital sea lanes, and the establishment of local military superiority in the air, on and under the water's surface. Sea control—as can be made evident in an examination of sea lines of communications—is also a critical peacetime attribute.

A viable challenge to United States' control of vital SLOCs where and when desired would have enormous geopolitical significance in the first half of the 21<sup>st</sup> century.

An inability to be predominant in the world's oceans, a position that America has enjoyed since the end of World War II, would call into question one of the essential cornerstones of postwar American national security and prosperity. Today the United States remains the only nation in the world capable of projecting and sustaining significant power on a global basis. It cannot do so without the certain ability to establish and maintain sea control. None of the roles and missions that the Navy aspires to, or national leadership would direct, can be successful without sea control. Providing sea control is a necessary attribute.

## Open and Wise to Technological Change

Navies have always been amongst the most technical of man's endeavors. Throughout history, ships have ranked among mankind's most complex engineering projects. In the 1800s, the 44-gun frigate *Constitution* was the most technologically complex endeavor undertaken by the newly-constituted United States government.

Until the start of the manned space program of the 1960s, the U.S. embarked on no more difficult, complex, and demanding endeavor than that of providing and maintaining an advanced global navy. Consider, for example, the immense



*SM-3 Block 1B missile is launched from USS LakeErie (CG-70) towards a successfully interception of a short-range ballistic missile target in the Pacific Ocean, 18 September 2013.*



effort and resources required to build and maintain nuclear-powered submarines and aircraft carriers.

Historically, increased mastery of the maritime environment was facilitated by technological advances. As previously noted, improvements in ship characteristics, shipbuilding technologies, and navigational science enabled commercial and naval seafarers to sail farther, faster, longer, and more frequently. Add to these the increasing threats and demands of war fighting and one clearly sees the need for our Navy to be *open and wise to technological change*. Navy officers and sailors—not all scientists, engineers, or mechanics—have been members of a technically oriented organization for more than two hundred years. The need for an able seaman to “hand, reef, and steer” changed over time to being able to operate, maintain and repair technical equipment. With the advent of steam propulsion in the latter part of the 19<sup>th</sup> century, sea-going culture changed as technology continued to evolve. U.S. Navy officers and sailors have been on the forefront of cutting-edge technological development. Rear Admiral John Dahlgren in ordnance, Rear Admiral Benjamin Isherwood in steam propulsion, Admiral Hyman Rickover in nuclear propulsion and nuclear power generation, Vice Admiral Levering Smith in missiles, and Rear Admiral Grace Hopper in computer software were all pioneers.

Our Navy professionals of today are the direct professional descendants of such innovators. Thus, a continuing attribute of the U.S. Navy is to be open and wise in the use of new technologies.

A popular criticism—largely founded on the widespread publicity of Brigadier General William Mitchell’s efforts to create an independent U.S. Air Force in the 1920s—is that the pre-World War II “Battleship Navy” was scornful of new innovation, such as the development of aircraft carrier air power. In fact, the Navy had already conducted its own experiments in bombing surface ships even

before Mitchell’s publicized demonstration. The Navy had already taken quiet, professional steps to investigate the impact of this emerging combat technology.

More importantly, the pre-World War II Navy actively pursued and allocated significant resources into navy aviation. The methods initially pursued included seaplanes and airships, technologies that technically qualified proponents claimed were more practical and cheaper than carrier aviation—a significant interest in an era of low military budgets.

The point of correcting the historical record is to identify the Navy’s historical *openness to technological innovation and its wise use of its potentially transformative effects* as one of its long-standing and future-oriented attributes.

Being used to the U.S. Navy’s ability to command the seas, some analysts have postulated that future conflicts at sea will be easily understood, controlled, and mastered by technology alone. Granted, since the earliest of times, man’s technological advances have had a direct impact on the manner in which he has made war. From oared ships to H-bombs, military history has been as much the story of applying scientific advances to war as it has been about victorious generals and admirals. Yet, technology rarely simplifies war. Rather it makes it infinitely more complex. Each new scientific development, each new weapons system, demands fresh thought and ever-greater tactics, techniques, and procedures.

That is why the Navy must preserve the attribute of being wise to technological innovation and change. Innovations must be tested as to how they can withstand the maritime environment and contribute to navy war fighting, not how they look on paper. Transformation is often touted as needed to match future threats.

But questions will remain. How does the particular innovation contribute to effectiveness in naval warfare? What capabilities may need to be sacrificed? What are the long-term costs? Combining openness with caution and skepticism is a reflection of such wisdom.

### Capability to Generate and Handle Information

Operating dispersed navy forces in distant regions in a challenging environment requires a high level of capabilities to *collect, process and disseminate information*.

Information is required concerning the environment, the threat, and assigned missions. Throughout its existence, our Navy has continually sought ways to make the flow of information from and to its operating units more efficient and effective.

Earlier we noted that the development of commercial radio in the early 20th century was an outgrowth of U.S. Navy efforts to use wireless communication to pass information to ships and aircraft at sea. With a long history of improving its methods and modes of information transfer, the U.S. Navy has built a strategic attribute of *being able to generate and handle expanding quantities of operational information*. This has never been a pursuit of information for information’s sake, but a facility to improve operational capabilities derived from the open and wise approach to technological change.

Prior to hostilities, the routine operation of navy forces can—as also noted earlier—



*USS Constitution today firing a salute during an underway demonstration at Boston, 4 July 2014.*



## A Culture of Leadership

In the first chapter we discussed how the maritime environment demands initiative and leadership on all levels of a sea-going crew. In fact, a culture of leadership is one of the most important attributes of the U.S. Navy.

In January 1959, then-Chief of Naval Operations Admiral Arleigh Burke—a navy hero of World War II—wrote:

*There is one element in the profession of arms that transcends all others in importance; this is the human element. No matter what the weapons of the future may be, no matter how they are to be employed in war or international diplomacy, man will still be the most important factor in naval operations. This is why it is so important that under the greater pressure of our continuing need to develop the finest aircraft, the most modern submarines, the most far ranging carriers and the whole complex of nuclear weapons; we must keep uppermost in mind that leadership remains our most important task.*

It is fair to ask, what is this attribute we call “leadership”? Leadership has been described by some as the “ability to influence people to do things they would not otherwise want to do.” But navy leadership might more properly be described as inspiring the personnel and collective attributes that we have discussed.

There are many good sources for the study of leadership and their insights will not be replicated here. What should be acknowledged is that the practical concepts of leadership that we value are intimately connected to the attributes of navy forces we have discussed. Historically, the Navy’s culture of leadership development has been forged by experience in operating independently at sea. We have a long tradition of producing resourceful leaders who can anticipate problems and exercise authority in decision making. The time-tested leadership tenets of *trust, respect, competence, and confidence*, based directly on the Navy’s core values are as important today as they have ever been. They ensure that *leadership* itself remains the key navy attribute.

To maintain the leadership attribute, we must have forward-thinking leader development training that cultivates critical thinking, broadens decision-making perspectives, builds cultural awareness, fosters innovation, encourages life-long learning, and shapes and enhances character and integrity while respecting the traditions and achievements of the past.

To that end, the evolving Navy leadership development strategy of today emphasizes four core elements to furthering our leadership traditions: education, training, experience, and self-development.

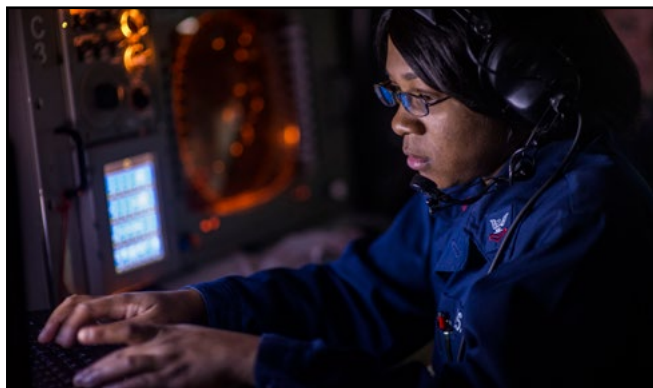
Education inculcates the fundamental tenets of Navy leadership, broadens the understanding of the navy profession, imparts advanced knowledge, and fosters intellectual and character development. Education fosters critical thinking.

Education also serves to contextualize past experience to assist the application of new learning to future assignments.

—result in building a day-in and day-out tacit knowledge base to provide more complete knowledge of the battlespace and track the movements of potential adversary forces. This is the foundation of battlespace control: monitoring the movements of an adversary to facilitate rapid, decisive combat response at the onset of hostilities. The challenge to U.S. forces is collecting information from a wide variety of sources—surveillance systems on the aircraft, submarines, and surface ships at sea, intelligence developed from national sensors, tipper information from Special Operations Forces (SOF) ashore—then assembling that data into a coherent picture that helps our understanding and, finally, distributing it throughout the force. The goal is to gain and maintain the knowledge required to act decisively at the onset of hostilities.

It is reasonable to assume that the response time for future navy combat actions will be much shorter than they are today. Changes in the dimensions of space and time will considerably increase the tempo of events at sea. The impact of cyberspace will further blur the boundaries. The enormous advances in technology in recent years have elevated information as a common link among the operational factors of space, time, and force. Information will increasingly affect each of these factors, both individually and in combination. Advances in computer processing, precise global positioning, and telecommunications will provide the capability to determine accurate locations of friendly and enemy forces, and to collect, process, and distribute relevant data to thousands of locations. Simultaneously, the new information technologies will have the capability to absorb, evaluate, use, transmit, and exchange large volumes of information at high speeds to multiple recipients. Diverse sources of data may be correlated faster than ever.

This ability to *generate and handle information* has been a historic attribute of U.S. navy forces and one that is critical to continue. This attribute is a requirement of both the maritime environment and the necessity to counter potential threats in accordance with national security needs.



*Ability to handle expanding quantities of operational information: In CIC of USS Barry (DDG-52) in the Mediterranean Sea, 15 September 2013.*





## Attributes of Navy Forces and National Policy

Deterrence of war, regional security, 21st century economics and the reality of America as a maritime nation defines today's need for the U.S. Navy. What kind of Navy does the nation need? Given America's status as a global power, its desire to exert its influence worldwide, and its general policy of countering threats to security away from its shores, it demands a globally postured Navy to underwrite its strategic objectives. The United States Navy must be capable of fulfilling its enduring purposes against all levels of threat. And these purposes, for more than 200 years, have been highly relevant in the larger context of American foreign and national security policy. What has provided this relevance despite changes in technology, specific national policies, and the diffusion of global power has been the timeless nature of the attributes of navy forces we have discussed.

These attributes transcend time because they fulfill the fundamental requirements of the maritime environment and navy warfare. John Paul Jones and his sailors would recognize the concepts behind forward presence, deterrence, power projection, assured access and sea control as surely as they understood the necessary attributes of individual sailors and crews. They are fundamental and they are the attributes the U.S. Navy provides our Nation. The following Chapter will discuss the historical effects of the attributes, and Chapter 4 details the applicability to current and future operations.

As a maritime nation, we rely on our ability to protect our nation and national security interests at far distances from our shores. Over the past 200 years, the U.S. Navy has not only guarded this nation's vital interests, but also projected those interests around the globe with great success. Retaining a strong Navy capable of commanding the seas and providing a timely response in times of crisis



*The annual Arleigh Burke Trophy was established in 1962 to recognize the most improved ship in the Atlantic and Pacific Fleets in Battle Efficiency, reflecting the Admiral's view that the element of leadership is the most important in a crew's performance.*



*Training designed to build competence and confidence: damage control drill aboard USS Makin Island (LHD-8), 14 June 2014.*

is a fundamental aspect of America's status as a global power. That precept—and the attributes that support it—should help guide the choices this nation makes concerning investing in and maintaining its Navy for the 21st century.

#### *Strategic Attributes of U.S. Naval Forces*

- Ability to Operate Forward
- Providing Complex “Conventional” Deterrence
- Assuring Access for Power Projection
- Sea Control and Area and Battlespace Control
- Open and Wise to Technological Change
- Capability to Generate and Deal with Information
- A Culture of Leadership







## History of How We Fought

The attributes of the U.S. Navy and its critical importance to the defense, economic development and foreign policy of our Nation have been evident throughout the Navy's history. Its legacy of honor, courage and commitment, openness to innovation, and good stewardship of the Nation's resources can also be seen throughout the Navy's development. Even during periods in which its resources were limited, the Navy has carried out its mission with dedication, using assets to their fullest extent. Risks it has sometimes had to take; but, as previously described, sailors are used to risks in the difficult environments in which they routinely operate.

This is not to say that the Navy's history has never been blemished by the prejudices and attitudes then current in American society. Between the reconstruction period following the Civil War to the 1950s, opportunities for African-Americans and other ethnic groups were limited—an irony since free African-Americans and men from Asia-Pacific were welcome in American crews during the age of sail. Throughout its history, however, the Navy has endeavored to improve conditions for its sailors at the same time it strengthened its fighting capabilities. In this regard, we try to learn today from the mistakes of the past.

What follows is not intended as a complete history of the U.S. Navy or earlier navies, but rather an episodic illustration of how the Navy emerged from the nature of the maritime environment, developed its attributes, applied its core values in combat, and built the Service we have today. A particular focus is on vignettes describing critical battles; their intent is to illustrate how navy warfare evolved and how the U.S. Navy applied its attributes.



*Integrated gun crew, USS English (DD-696) in Korean War operations, October 1950-February 1951.*



## History of How We Fought





No navy, our own included, has been victorious in every engagement. Even in defeat there has always been much to learn—how to improve our capabilities, our tactics, and our deployment of forces. Important too, is our heritage. Your own navy service echoes the dedication, efforts, and sacrifices of the U.S. sailors of the past, who stood their watches—using the technologies of their day—in much the same manner as today. Our history abounds with inspiration.

### Early Naval Warfare

From the earliest times when humans first put to sea, ships had no equals as means of communication and hauling cargoes. With little modification, merchant ships could be used as warships, protecting trading fleets, spearheading expansion or control of empires, defending native coastlines and city-ports in time of war, or menacing hostile territory and trade routes. Trade was the reason people took to sea and protection or interdiction of trade were among the first reasons to form a navy. Historically, nations whose economies depended on trade sought to maintain navies.

The maritime environment has always been difficult to master. Wooden ships driven by wind power or human-powered oars were particularly at the mercy of the elements; getting ships to the right location at the right time to conduct military operations remained an enormous manpower, training, and logistics challenge. Only the great military and trading nations and empires could afford to support and maintain extensive navies. Actual warfare at sea, however, was relatively rare in comparison to the role of transporting troops, suppressing piracy, and blockading and laying siege to coastal cities of hostile states.

In ancient times, naval battles were fought by oar-powered galleys manned and rowed by crews who doubled as marines, and when ashore, soldiers. A galley also had a single mast and sail, with oars only used in battle or when becalmed. For fighting at sea at a distance, arrows were used; but when adversaries closed one another, the battle was decided by spear and sword in hand-to-hand fighting.

As seafaring technology developed, the galleys featured a projecting ram on the bow near the waterline. Skillful captains maneuvered their vessels to crash through the side of an enemy ship or ride up on the deck, swamping or capsizing their target. This type of galley, sometimes carrying catapults and ballistas (the origin of our word “ballistic”) capable of firing rocks, flaming balls of pitch, and deadly anti-personnel darts, was used by the military and trading fleets of the Mediterranean world for over 2,000 years.

### From Rams to Fires

The age of exploration and discovery starting in the 1400s was made possible by technological advances in sail design and development of the sternpost rudder, and was fueled by the thirst for trade. Galleys could not operate in the heavy seas of the Atlantic, and the expanding maritime environment doomed their use. In

1571, the last major naval battle in history between fleets of galleys was fought in the Gulf of Lepanto, off Greece’s west coast in the Ionian Sea. As one technology was succeeded by another, this was also the first major battle at sea decided by the firepower of cannon.

Gunpowder weapons fundamentally changed the types of warships being constructed. While artillery could be installed in galleys, cannons were much more easily installed on sailing ships that did not have multiple tiers of rowers. An ongoing process throughout the 1500s saw galleys gradually replaced by sailing ships.

Sailing ships were also more capable of open ocean transits than galleys. With the opening of water routes to the Orient and the discovery of the Americas, world commerce grew well beyond the confines of the Mediterranean Sea. Northern and western European nations began building sailing ships capable of transiting the stormy seas beyond. A larger maritime environment was being mastered.

### Revolution and Royal Navy Supremacy

From the earliest European explorations of North America, sea power was the principal determinant in the success, or failure, of colonization, trade routes, ports, frontier outposts, foreign alliances, and conflicts between competing imperial powers for dominance of the continent.

By the end of the Seven Years War in 1763, no nation in the world could match Britain’s Royal Navy. The Industrial Revolution occurred first in Great Britain, and the resultant industrial base, combined with the fiscal power of banking and insurance, made Britain the richest nation on earth. Avoiding significant involvement in land warfare in Europe for almost two centuries, Britain devoted almost all its enormous resources to protecting and expanding its position as the world’s leading maritime trader. Royal Navy ships comprised the most technologically advanced, well-trained maritime force in the world.

Thus, the British coastal colonies of North America that would eventually comprise the first 13 states of the United States had an inclination to the sea. From whaling ships and fishing vessels to commercial ships, America was not only part of a great maritime empire, but also possessed its own seagoing culture as well. New ships were built and older ones repaired in shipyards from Norfolk to Boston. A middle class in the colonies developed as skilled labor, principally shipwrights, carpenters, and caulkers, found their place in colonial society.

Neither the economic aspects of maritime commerce nor the compelling military aspects of maritime power were lost on colonial leaders. From the time the first shots of the Revolution were fired on the Lexington Common, colonial leaders expressed a desire to create a navy. Samuel and John Adams pressed other colonial leaders to build a navy on the British example. In August 1775, the Rhode Island delegation urged the Continental Congress to begin building and equipping ships to carry the war to the Royal Navy. The proposal was opposed by delegates from other colonies who feared such a “warlike” action would lead irrevocably to independence, a situation many colonial leaders were not willing to accept at



this early stage of the rebellion.

Building a colonial navy was controversial, but sending privately-owned and funded vessels out to prey on British shipping under licenses called “letters of marque and reprisal” was acceptable, and promised windfall profits to the successful captains and crews of such vessels known as privateers. Privateering was not considered piracy, and had been used with great success by Britain in combating the Spanish and French Empires in the New World since the early 17<sup>th</sup> century. Now it would be used with equal success by colonial businessmen, and the available shipping for charter or purchase, along with experienced seagoing crews, were to be found in the colonies’ largest ports: Boston, Newport, New York, Philadelphia, Baltimore, and Charleston.

American privateers ranged the western Atlantic from Newfoundland to the Florida Keys, but concentrated on the Caribbean where the richest prizes were to be found. Thousands of British merchant ships were seized during the Revolution, and the Royal Navy sought, unsuccessfully, to deal with the threat. In October 1775, a squadron of British warships, in retaliation for privateer activity in the waters off Canada, attacked the port of Falmouth, Massachusetts, today’s Portland, Maine. The bombardment and burning of Falmouth hardened the resolve of many New Englanders to fight Britain to the death and encouraged pro-navy members of the Continental Congress to renew their call for funding and building an American navy as soon as possible.

A Naval Committee was established and eight merchantmen then in colonial ports were selected to be converted to warships. The conversion of these ships took several months and included cutting new gun ports, modifying ship rigging, and strengthening hulls. At the same time a leading shipyard in Philadelphia submitted to the Continental Congress a plan to build several light frigates fitted out with up to 32 guns.

Several colonies also built small ships to answer the specific defensive needs of Continental Army commanders. Row-galleys were funded and built by Pennsylvania to defend the Delaware River approaches to Philadelphia. A small fleet of ships funded by New York and Rhode Island under the command of Benedict Arnold, a former Connecticut merchant captain (years later a traitor who defected to the British), was built on Lake Champlain to contest British control of this invasion route from Canada to New York and the Hudson River. Although suffering a defeat, Arnold’s naval force delayed the British invasion for a year, during which time the colonial army became strong enough to defeat it on land. Today, we would call this “joint operations.” Some historians believe this action, called the Battle of Valcour Island, was the most important naval action until the French fleet blockaded the British army at Yorktown and forced them to surrender to Washington’s forces. In his narrative of the battle, Captain Alfred Thayer Mahan stated, “Never had any force, big or small, lived to better purpose or died more gloriously.” The operation demonstrated the strategic impact of naval forces in impeding an adversary’s ability to move troops and sustain them. A comparable effect

using land forces usually requires much greater numbers of men and equipment. The U.S. has capitalized on this naval advantage throughout our history.

## Revolutionary Ships on the High Seas

Recognizing the importance that British leadership placed on the Royal Navy controlling the seas, the Continental Congress decided to contest that reality. On November 20, 1776, it authorized the construction of national warships. One of the ships authorized by the Continental Congress, the 18-gun *Ranger*, was launched in May 1777. After delivering news of the surrender of the British Army under General Burgoyne at Saratoga to the French government, *Ranger*, under the command of Captain John Paul Jones, conducted a raid on the British port of Whitehaven, on Britain’s west coast in April 1778. This raid gained great notoriety amongst the British public for being the first time an enemy landing party had set foot on English soil since 1667.

Jones’s daring raid in *Ranger*, and his later famous engagement in command of *Bonhomme Richard* against the Royal Navy frigate *HMS Serapis* were among the most notable achievements of the Continental Navy, and the news of their exploits did much to maintain public support for the revolutionary spirit. However, many other naval actions, including amphibious operations, were dismal failures. The lessons being learned were that the infant U.S. Navy needed effective training, leadership, and experience if it wanted to challenge the world’s largest navy.

When France officially sided with the colonies in late 1777, the war at sea fundamentally changed. What was once an effort by Britain to subdue rebellious colonists in limited battles for equally limited objectives was now a global conflict that eventually led to a fleet action that forced the British Army to end the war.

After a costly campaign in the Carolinas fighting the American army, the British Southern Army under Lord Cornwallis arrived in Yorktown, Virginia, in early August 1781. At the same time, French Admiral Comte De Grasse’s fleet of ships-of-the-line sailed for the Chesapeake Bay to join with Washington’s army in Virginia. The British were now under siege by a superior force on land, and a British fleet of 19 ships-of-the-line was dispatched from New York to defeat the French fleet and evacuate the British Army. The conditions were set for the most important naval engagement of the war. When the battle of Chesapeake Bay was over, the British fleet was forced to return to New York and Cornwallis surrendered on October 19, 1781. On hearing of Cornwallis’s fate at Yorktown, King George’s Prime Minister, Lord North, exclaimed, “Oh God! It is all over!” And so it was.

Two years later the Treaty of Paris was signed in September 1783 at Versailles, France. Congress, now under the auspices of the Articles of Confederation, ordered all Continental Navy ships and American privateers to return to their home ports. By the time the ink had dried on the treaty, the Continental Navy had largely ceased to exist. A 74-gun ship-of-the-line completed in September 1782, *America*, was given to France. Because it had no power of taxation under the Articles of Confederation, Congress had no money to retain any sort of sea service. It directed that whatever



remained of the Continental Navy be removed from government service as soon as possible. In June 1785, the final ship in commission, the 32-gun frigate *Alliance*, was sold at auction. The Continental Navy was no more.

### Pirates, Privateers, and the Need for a U.S. Navy

In September 1788 the Constitution was ratified, and the first national elections were held shortly thereafter. George Washington was unanimously elected as the first President and John Adams the first Vice President. Thomas Jefferson was appointed as Secretary of State and Alexander Hamilton as Secretary of the Treasury. The Constitution charged the Congress “to provide and maintain a navy” and responsibility for the conduct of naval affairs was placed with the War Department. But seeking to avoid such expenses, many in Congress opposed the building of warships.

Meanwhile, the issue of pirates in the Mediterranean had been a problem since the end of the Revolution. Without a Navy, the American governments were willing to pay protection money to a group of North African Muslim states: Morocco, Algiers, Tunis, and Tripoli, whose corsairs were collectively known as the “Barbary pirates.” The “piracy” was state-sponsored and organized by North African emirs, and frequently encouraged by a vengeful Great Britain. Without a means to protect its merchant trade, America grudgingly paid the protection money.

However, American merchant shipping was still falling prey to piracy with no

end in sight. In January 1791, with Algeria refusing any agreement with the United States, the Senate recommended to the President that a naval force be built to operate in the Mediterranean and protect American commerce.

Washington agreed with the Senate. In Washington’s mind the need for a navy was never more apparent: “If we desire to avoid insult we must be able to repel it; if we desire to secure peace—one of the most powerful instruments of our prosperity—it must be known that we are, at all times, ready for war.” He had already proposed building a navy to certain cabinet members; but opposition stymied any authorization bill making its way through both houses of Congress. The French Revolution in 1792 further complicated matters, as French privateers began preying on both American and British merchant vessels.

The second U.S. president, John Adams was also determined to begin building a U.S. Navy and succeeded in convincing Congress to pass legislation in 1798 to start construction of six heavy frigates: *Constitution*, *United States*, *Constellation*, *President*, *Congress* and *Chesapeake*. Although not fully equipped until the next decade, these frigates would be the core of naval operations against the Barbary pirates and in the War of 1812. Other, less capable ships were also purchased.

When Thomas Jefferson became the third President in 1801, he directed that all the payments to the Barbary pirates cease. In response, Tripoli declared war on the United States.

The most famous engagements of the Barbary Wars came in 1803 and 1804 when a squadron commanded by Commodore Edward Preble attacked and blockaded the pirate city of Tripoli. With his main force in Sicily, Malta, and Mallorca, Preble left a single frigate and several smaller craft to patrol the Tripolitan coast. When the frigate, *USS Philadelphia*, subsequently ran aground and was captured by the pirates, a raiding party led by Lieutenant Stephen Decatur stole into the harbor under the muzzles of cannon during the night of February 16, 1804, and set the captured ship afire. Decatur’s action was deemed by Britain’s Admiral Lord Nelson as “the most bold and daring act of the age” and brought both prestige and public spotlight to the role of the U.S. Navy in defending American interests abroad.

An end to the first series of Barbary Wars finally came in 1805 when a combined overland assault by U.S. Marines, Arabs, and Greeks, complemented by the Navy’s blockade and vigilant patrols at sea, forced Tripoli to surrender. A peace treaty was negotiated with Tripoli, but wars with the other Barbary states continued until 1815. It was this threat of state-sponsored piracy that provided the initial justification for a permanent United States Navy.

### Gunboats or Frigates and the War of 1812

Although Jefferson initially supported a strong Navy directed against the Barbary pirates, his principal concern was elimination of the national debt. Based on the recommendation of his Secretary of the Treasury, Albert Gallatin, he decided that cutting back the Navy was the best way to save money. Gallatin pointed out



Painting of the bombardment of Tripoli by Commodore Preble’s squadron, 3 August 1804.





that the Navy was the largest single expenditure of the Federal Government and recommended cutting its budget by two-thirds.

As President, Jefferson wanted a defensive-oriented, affordable Navy. Even while using the frigates of the previous Adams Administration to deal with the Barbary pirates, the President pushed through Congress a series of funding bills that authorized a total of 278 small gunboats to be constructed between 1803 and 1805. The requirements for these gunboats fulfilled the President's vision of America's Navy. They were inexpensive to build and maintain, adequate to patrol the Atlantic and Gulf coastlines, able to establish and maintain harbor security, but unseaworthy and utterly incapable of involving America in overseas missions or wars. The President acknowledged that the gunboats, unlike frigates or ships-of-the-line, were incapable of making transoceanic voyages; but that was exactly the Navy he thought the nation should have, one unable "to engage in offensive maritime war." He drew up plans to station gunboats at numerous ports and coastal area from Boston to--thanks to the Louisiana Purchase--the newly acquired port of New Orleans.

Unfortunately, when the United States went to war with Great Britain in 1812 under President Madison--precipitated by the Royal Navy's impressment of sailors from American ships--the gunboats proved themselves worthless in war against the world's most powerful oceangoing navy. Indeed, it was the U.S. Navy's previous fleet of eight frigates rushed into service that achieved an impressive number of at sea victories between August and November 1812, such as the famous battle between the USS *Constitution*--nicknamed Old Ironsides--and the HMS *Guerriere*.



Contemporary painting of last phase of battle between USS *Constitution* versus HMS *Guerriere*, August 2, 1812.

They maintained American morale during the war, even though they could not protect American trade against a Royal Navy of more than 1,000 ships, including 120 ships-of-the-line and 116 frigates. At the same time, the U.S. Navy fought on the Great Lakes, preventing numerous attempts at a British invasion from Canada.

The most infamous failure of this gunboat fleet was that of defending Washington and Baltimore in the summer of 1814. Unable to prevent British landings, the gunboats were scuttled and burned. Their 400 Sailors and Marines served on the battle line with the Army at Bladensburg, where their joint defeat permitted the British to burn the White House and most government buildings in Washington on August 24, 1814.

Britain eventually decided that dealing with other events in its growing empire was more important than continuing its war against the U.S., and a peace treaty ending the War of 1812 was approved by the U.S. Senate in February 1815. President Madison had learned firsthand the value of a seagoing Navy and general purpose ships (as opposed to small gunboats). Madison now viewed the Navy as an essential part of the government of the United States, and when budget economies were put into effect after the war's end, the "gradual advancement of the naval establishment" was funded. The U.S. needed to be able to hold adversary forces at risk and away from our coasts, protect its trade overseas, and project power against enemy shores.

Following the War of 1812, the Navy represented American interests worldwide, helped the Royal Navy eliminate the overseas slave trade, engaged in several scientific and exploratory expeditions, and introduced steam propulsion, rifled ordnance, and exploding shells in the Fleet. The Navy's next war fighting challenge was the Civil War--the outbreak of which divided its sailors and officers.

## Historical Vignette: Battle of Lake Erie.

Which nation, Great Britain or the United States, would control the Michigan, Indiana, and Illinois Territories, the Old Northwest, was a subject of dispute when, at the urging of President James Madison, Congress declared war on the British Empire in June 1812. In March 1813 Master Commandant (Commodore) Oliver Hazard Perry arrived on the southern coast of Lake Erie, charged by the Secretary of the Navy with building a squadron of ships to wrest control of the lake from the Royal Navy. Displaying a keen understanding of ship construction, logistics, and training, Perry built a squadron of two 20-gun brigs, *Lawrence* and *Niagara*, and a number of smaller supporting vessels from the forests of Pennsylvania, far away from established shipyards--a considerable technical achievement. Surprising the British with the speed of his preparations, Perry's squadron sailed west along the southern shore of Lake Erie, arriving near present-day Toledo, Ohio, in mid-August. Short of sailors, Perry requested support from Major General William Henry Harrison (who later became President). In one of the most prominent instances of "jointness" in early American military operations, Harrison provided 130 Army volunteers to fully man the Navy's squadron of ships.

On September 10, 1813, a Royal Navy squadron discovered Perry's ships.



*Perry sortied, and the two squadrons fought a conventional battle very similar to those fought at sea. With his flagship Lawrence badly damaged and more than half the crew killed or wounded, Perry transferred his battle flag to Niagara, standing upright in a cutter while being taken under fire by British warships. Taking command of Niagara, Perry ordered all fighting sail set and headed for the center of the British line-of-battle. The two largest Royal Navy vessels became entangled as they attempted to maneuver to respond to Niagara's broadsides. With casualties mounting, and senior officers killed or incapacitated, the two British warships struck their colors; the supporting smaller vessels either surrendered or were pursued and destroyed by the other American ships.*

*The most important naval confrontation of the War of 1812, the battle of Lake Erie determined that the Great Lakes region would fly the American flag. It also marked the U.S. Navy's first successful squadron action and one of the Royal Navy's rare surrenders of an entire group of warships. Three hours after the battle, Perry sent a message to General Harrison and the Madison Administration which began, "We have met the enemy and they are ours..." Matching John Paul Jones's "I have not yet begun to fight" in brevity and import, symbolic of a young nation ascribing to greatness, these two expressions began the fighting traditions of our Navy. The battle showed the importance of coordination, training, technical skill, and tenacious, inspiring leadership in U.S. naval warfare: "how we fight."*

### Civil War Sea Control and Blockade of Southern Ports

Forty-six years after the end of the War of 1812 and just six days after the fall of Fort Sumter in Charleston, South Carolina's harbor on April 13, 1861, President Abraham Lincoln ordered the Navy to begin blockading Southern ports from South Carolina to Texas, including New Orleans at the mouth of the Mississippi River. The American Civil War had begun. On April 27, 1861, after Virginia and North Carolina joined the Confederacy, the blockade was extended to include the coast lines of these states as well.

The President was aware that the Navy did not have nearly enough warships to establish a credible blockade of more than 3,000 miles of coast line from the Chesapeake Bay to the Mexican border. He was also aware that under international law a proclaimed blockade has to be effective to be considered legitimate. Lincoln instructed his Navy Secretary, Gideon Welles, to get more ships as fast as possible; Welles began an aggressive effort to build or buy as many warships as he could.

Armed with Treasury funds, the Navy's purchasing agents combed the New England and Mid-Atlantic waterfronts searching for hulls in the water; a total of 89 ships were purchased for \$3.5 million. Merchant ships, ferries, and packet boats had their decks strengthened to support cannon. Navy ships were recalled from foreign stations, and older vessels that had been laid up were restored to active service. By December 1861, Secretary Welles could report that, starting from an available force of 76 ships in March 1861, 264 ships--more than half of



*Painting of Perry transferring to Niagara at Battle of Lake Erie, 1813.*

them merchant ships--had been commissioned into the Navy.

In the spring of 1862, blockading forces were in place at all major Southern ports from Hampton Roads to Galveston, Texas. Joint Army-Navy and Marine Corps assaults captured key locations off the Carolinas and Mississippi for use as supply bases for blockading ships. Confederate privateers, which had flourished in the first eight months of the war, largely vanished, replaced by blockade runners. By the end of 1863 there were 588 U.S. Navy ships in commission fighting for the Union.

In 1861, about nine of ten ships attempting to run or avoid the Union blockade succeeded. By 1865, the odds were only 50-50 that a blockade runner could succeed delivering cargo to a desperate Confederacy struggling to remain alive. In 1864, Wilmington, North Carolina, the last port open to blockade running in the Confederacy shipped about \$65 million worth of cotton. When it was finally seized by a combined Army-Navy force in early 1865, the days of the blockade runner were over.

In the aftermath of the war, it was clear that the Navy's blockade of Southern ports, while not totally effective, had been one of the most decisive actions of the war. It hobbled the Southern economy, so dependent on cotton exports. Ten million bales of cotton had been shipped overseas in the three years before Fort Sumter. Between 1862 and 1865 only about one million bales of cotton ever made it to European textile mills. The blockade undermined Confederate credit in European capitals that could have been used to purchase war materials and led to ruinous inflation that destroyed the purchasing power of citizens from Richmond to New Orleans. In the end, it was the decaying morale of the Southern citizenry as much as battlefield defeat that led to the demise of the Confederacy.

While maintaining the blockade was the principal mission of the U.S. Navy during the Civil War, the Union's overwhelming naval superiority allowed it to establish and maintain sea control at any location of its choosing. Control of the sea allowed combined Army-Navy operations to win some of the first victories gained by the



Union in 1861; the Navy's ability to conduct power projection operations would continue to develop during the war. By the end of the Civil War, the organization and execution of Army/Navy combined operations within an environment of assured sea control had reached a degree of sophistication that would not be seen again until the amphibious landings of World War II.

### War in Littoral Waters and Rivers

Complying with the President's direction to extend the blockade into the Mississippi River and split the Confederacy into two, Navy Secretary Welles ordered Commander John Rodgers to report to St. Louis to aid the Army in arming gunboats that had been purchased from local vendors. Rodgers was charged with developing with the Army a means to project power down the Mississippi to split the Confederacy.

Secretary Welles initially did not place much importance on these operations, but as he spent more time with the President, he began to understand the importance the President was placing on capture of the Mississippi River. Now unwilling to simply assist the Army in building riverine warships, Welles made Rogers a flag officer in November 1861 (at the time the U.S. did not have the rank of admiral). Rather than using soldiers, the Navy began manning the gunboats with sailors, and the vessels were organized into a naval unit designated the "Western Flotilla." Starting in February 1862 the Union engaged in a series of joint operations on a small scale in inland rivers in the Confederacy west of the Allegheny Mountains. These would, by the end of the war, evolve into sophisticated tools of power projection. In executing the President's desires, Secretary Welles put into motion a series of events that showed how naval operations can use maneuver and mobile artillery to project power ashore and support ground forces.

#### *Historical vignette: Campaign on the Rivers.*

*In January 1862 Confederate forces in the West held a line through central Tennessee, including Nashville. President Lincoln directed that Tennessee be retaken for the Union as soon as possible, and a relatively junior Brigadier General, Ulysses S. Grant, was assigned the initial foray into enemy territory. From the earliest stages of his Civil War career, it was evident that Grant was a fighter. He found his naval counterpart in Navy Captain Andrew H. Foote. Soon designated a "Flag Officer" by the Secretary of the Navy to ensure parity with Army generals, Foote was a salt water sailor who found himself assigned to support the Army in its campaign to regain Tennessee. Grant and Foote formed a partnership unusual in the American Army and Navy at the time.*

*In addition to three steamboats clad in heavy oak to resist small arms fire, Foote's Western Flotilla included seven special purpose mortar ships specifically designed to destroy Confederate shore artillery emplacements and fortifications. Called "turtles" because of their strange appearance, the ironclads*

*proved equal to the tasks assigned the Navy by Grant.*

*In early February 1862, Foote's steamboats, accompanied by the turtles, ferried 17,000 soldiers of Grant's command up the Tennessee River; the Union objective was newly constructed Fort Henry. On the morning of 5 February, after landing Grant's soldiers outside of gun range, four turtles in Foote's flotilla took up firing positions 1,700 yards from the riverbank and began shelling Fort Henry. For more than an hour, Union gunboats and 17 Confederate guns in the fort exchanged fire at ranges that shrank to a mere 200 yards. Finally, with only four Confederate guns remaining operational, the Confederate flag was lowered and the fort's commander surrendered to Flag Officer Foote.*

*Both the Union and Confederate high commands expected Grant to remain at Fort Henry, digging in and awaiting reinforcements. But that was not his manner. He ordered Flag Officer Foote to go back down the Tennessee River, lay over at Cairo, Illinois, for repairs, and then begin moving south up the Cumberland River. Senior Confederate officers believed Foote's turtles could overcome the other newly constructed fortification in central Tennessee, Fort Donelson, without Grant's army, so they elected to reinforce the fort's garrison. That was all the encouragement Grant needed.*

*On 12 February, Grant marched his army of 15,000 men across the lowland separating Forts Henry and Donelson. Two days later Foote's Western Flotilla arrived, bringing an additional 10,000 Union troops on 12 transports. An initial four gunboat assault on Fort Donelson's two waterside batteries was repulsed on 15 February, with the Union vessels sustaining serious damage. But the following morning a desperate Confederate attempt to break through Union lines failed when Grant ordered an equally desperate Union counterattack supported by Foote's gunboats. On 16 February the Confederate general commanding Fort Donelson surrendered.*

*Grant's and Foote's victory at Fort Donelson proved to be one of the most significant of the war. The operation had driven a wedge into the Confederate defensive line in the West and set the precedent for future combined operations on the Mississippi River as well as on the Atlantic coast.*

*Later, when Vicksburg, Mississippi was captured by a combined Army-Navy effort under Grant and Flag Officer David Dixon Porter (Foote's relief), the Confederacy was cut in two and the Mississippi River completely under Union control.*





Contemporary lithograph shows Flag Officer Porter's fleet running past the heavy fire from the Confederate forts blocking the Mississippi at Vicksburg in order to transfer General Grant's army across the river south of the city.

### Rise of the Ironclads

In the autumn of 1861 and just before Grant began his campaign on the Mississippi, President Lincoln and Secretary of the Navy Welles were shocked to learn that the South was building an ironclad! The threat of even one ironclad could offset the vast numbers of the wooden Union ships.

Those who had followed naval affairs in the 1850s should not have been surprised. The Confederate Secretary of the Navy was Stephen R. Mallory, a former senator from Florida and senior member on the Senate Committee on Naval Affairs. From his position of prominence he had closely watched technological developments in European navies. Though creation of an iron-hulled vessel had been contemplated as early as 1841, no such vessel had ever received serious attention by the Navy or substantial backing in Congress.

Mallory was under no illusions that the South could ever match the shipbuilding capabilities of the North. Recognizing this reality he drafted a strategic plan for the Confederate States Navy that had two essential elements: steam-powered ironclad ships fitted out with large caliber rifled guns to break the blockade and fast commerce raiders to attack Northern merchant ships. He expected that a small amount of new technology at sea could overcome the larger numbers of Union ships.

Mallory hoped to purchase ironclads abroad, but that plan fell through. However, the steam-powered frigate *USS Merrimack* fell into Confederate hands when the Union abandoned Gosport Navy Yard (now Norfolk Naval Shipyard) after the fall

of Fort Sumter. *Merrimack* had been burned to the waterline but Mallory now had both hull and machinery, as well as the material and capabilities of Gosport. The necessary physical and technical infrastructure was available to build an ironclad.

In the North, Secretary Welles appointed a group of naval officers to an "Ironclad Board" to investigate various plans and specifications to build an ironclad for the Union. Their report received Congressional support and Welles placed advertisements in various Northern newspapers soliciting proposals from interested shipbuilders. A proposal was presented to the Ironclad Board by a Swedish immigrant, inventor, engineer, and naval architect named John Ericsson. The new ship's design featured steam propulsion, low freeboard, a shallow-draft flat bottom and revolving turret housing two guns of the heaviest caliber then capable of being cast in the United States. Ericsson failed to convince skeptical Board members of its utility. But when he told the Board that he could build his ship in 100 days, the Board's perspective was suddenly changed. Here was a ship that might be ready by the time the Confederate ironclad got underway!

Knowing that Major General George McClelland's Army of the Potomac was to be landed somewhere on the Virginia peninsula north of the James River, Secretary Welles understood the Union had to have sea control in the Hampton Roads area, directly adjacent to the location of the nearly finished Confederate ironclad. He also knew that sea control could not be established and maintained unless the Union had a warship that could deal with the newly re-named *CSS Virginia*.

Ninety-seven days after her keel was laid, Ericsson's ship was launched. The Navy completed onboard testing and fitting out the ship as expeditiously as possible. What contemporary wags called a "cheese box on a raft" was commissioned *USS Monitor* on February 25, 1862. In early March she was dispatched to Hampton Roads where *CSS Virginia* was wrecking havoc on the Union blockading force.

By the evening of March 9, 1862, the first battle between two ironclad warships was over. Although neither could destroy the other, *Monitor* prevented *Virginia* from continuing to attack Union ships. By the end of the year, both ships would be lost, *Virginia* burned when Norfolk fell to Union troops, and *Monitor* lost to gale force winds off Cape Hatteras.

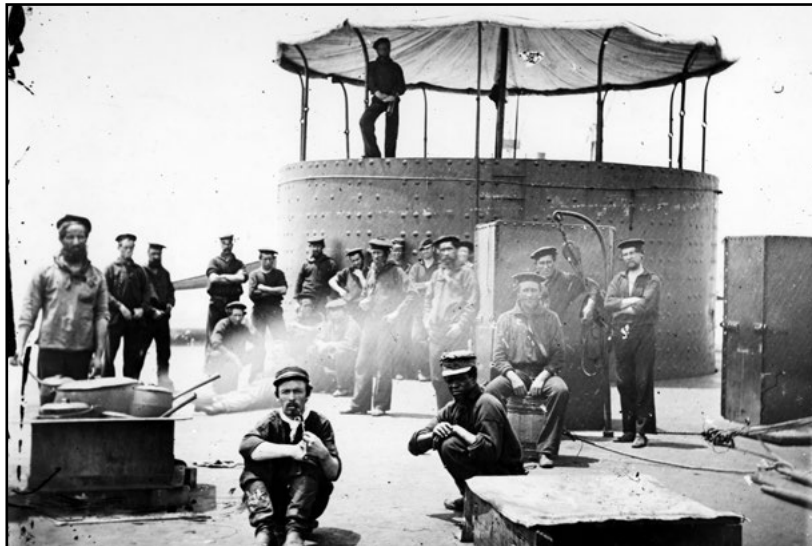
The engagement of *Monitor* and *Virginia* heralded the arrival of the Age of the Ironclad. Navies in Europe began calculating their strength, as well as that of their potential opponents, by the number of ironclad ships in their orders of battle. Reflective of the Confederate government's belief in ironclads, Richmond directed that a dozen more be built. The Lincoln Administration, with far greater material resources at their disposal, ordered 56 new ironclads.

In October 1863, Ericsson delivered *USS Manhattan*, twice as long as *Monitor* and armed with two 15-inch Dahlgren smoothbore cannons. *Manhattan* would see action at Mobile Bay with Farragut in August 1864; and, although it would see no further combat, it would continue in service until stricken from the active list in 1901.

Although several monitors would remain in commission well after the Civil War, their missions were largely restricted to coastal and harbor defense. In the



immediate postwar Navy, they were relevant; but when a transoceanic Navy began building in the 1880s, they were increasingly viewed as relics of an earlier time. America's manifest destiny was now expanding its own shores. New types of warships, built of steel rather than iron, and capable of transoceanic voyages were needed.



*USS Monitor crew awaiting their meal. There was no room within the ship for a galley, so cooking had to be done on deck.*

### **Ships Against Forts**

Once plans were in place to blockade the South, the U.S. Navy turned its attention to reducing shore fortifications protecting major ports in the Confederacy. Projecting power ashore became a more prominent mission for the Navy.

Old line sailors recalled Royal Navy Admiral Lord Nelson's admonishment: "A ship's a fool that fights a fort." Mid-19<sup>th</sup> century conventional wisdom held that one gun on land was worth four on the water. Some naval experts disagreed, arguing that new technologies, from steam propulsion that nullified the vagaries of wind and current, to exploding shells, rifled artillery, iron-hulled vessels, and floating batteries had tipped the balance in favor of the ship.

Port Royal, 50 miles up the South Carolina coast from Charleston, where the Civil War had begun, was thought to pose the greatest challenge to the Union Navy. Possessing the finest harbor on the Atlantic Coast south of Norfolk, its importance to maintaining the blockade was well understood by both sides. Two sand, earth, and wood forts guarded the entrance to Port Royal Sound. These forts were strongly built and manned by gun crews anticipating a Federal assault.

Captain Samuel F. DuPont led a force of 74 ships and a 12,000-man landing force

of Army troops south from Hampton Roads. A gale off Cape Hatteras dispersed the force so that only 25 ships were present, along with the transports, when operations were commenced against the Confederate forts at Port Royal on November 7, 1861. Exploiting the advantages of steam propulsion, Du Pont divided his force into 14 deeper draft ocean going ships and a force of gunboats and shallow draft vessels intended to intercept any opposing Confederate small craft. The heavier ships, frigates and sloops-of-war, slowly steamed in an expanding ellipse, taking the forts under fire. With each reversing of course, the ellipse expanded, bringing the superior firepower of the Union naval force to bear on the Confederate fortifications.

The Confederate fortifications had been built, and guns sighted, for engaging a Union force sailing straight through the entrance to Port Royal Sound. But with the Navy steaming in a constantly expanding ellipse, Southern gun accuracy was seriously eroded, and enfilading fire from the warships methodically destroyed the artillery emplacements. The Army transports landed and Union troops rapidly occupied the abandoned fieldworks. The Navy had neutralized the Confederate's most important port.

In April 1862, the superiority of high-velocity rifled ordnance over traditional masonry fortifications was shown at Savannah's Fort Pulaski, which Robert E. Lee, then a U.S. Army engineer, had helped design in 1846. It was considered the strongest coastal defense fort in the country. Like Port Royal, Savannah's usefulness as a Southern port for blockade runners was now gone.

By the summer of 1864 only Wilmington, North Carolina, and Mobile, Alabama, remained opened to blockade runners. Admiral Farragut was given the task of capturing the latter port. The Southern ironclad *CSS Tennessee*, rams, gunboats and three forts protected the Confederacy's last port on the Gulf coast. The most significant of these forts was Fort Morgan, built of masonry brick in 1834, and mounting 40 heavy guns and seven more in an exterior water battery.

Farragut, with experience in previous battles, was not intimidated by the forts. He was more worried about *Tennessee* and the submerged torpedoes, which were what naval mines were then called, planted in the channel leading to Mobile Bay.

Shortly after dawn on August 5, 1864, Farragut's squadron of four monitors and 14 wooden steam ships crossed the bar at the entrance to Mobile Bay. A vigorous exchange of gunfire with Fort Morgan was rendered more serious when the monitor *USS Tecumseh* struck a submerged torpedo and blew up. The transiting Union ships slowed to a halt, fearful of more torpedoes as *Tennessee* approached and Fort Morgan continued to pour fire on the stopped column. Standing in the mizzen rigging of his sloop-of-war *USS Hartford*, Farragut shouted a command that entered our navy lore as "Damn the torpedoes! Full speed ahead!" The Union flagship surged ahead, safely transiting through the minefield.

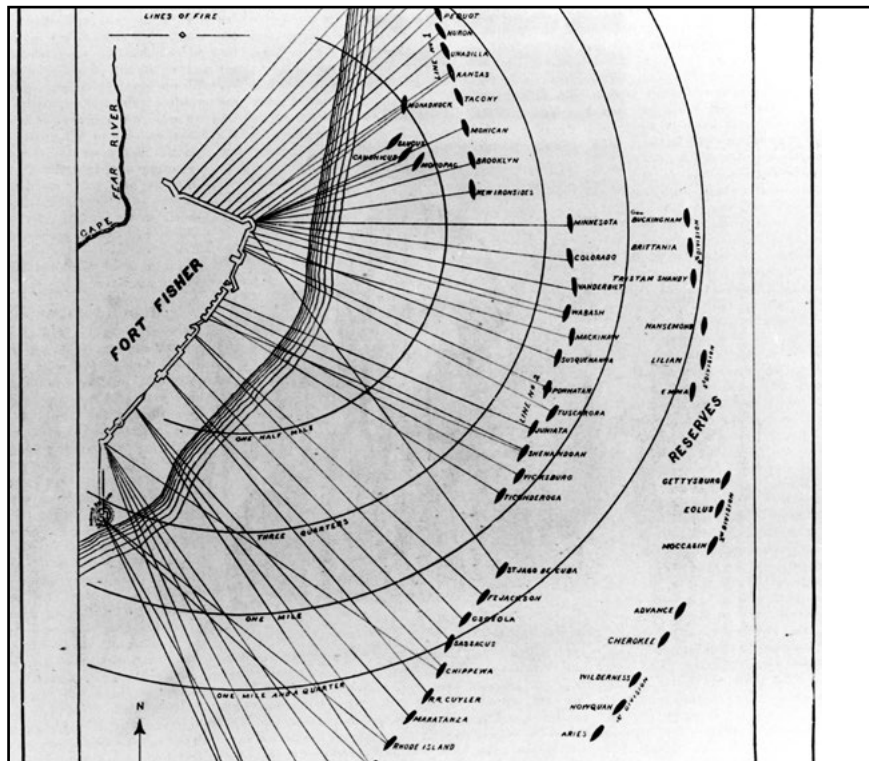
Because of the combination of armor, artillery and maneuverability, *CSS Tennessee* posed a much greater threat to the Union force than did the Confederate forts. After a prolonged engagement that inflicted considerable damage to several Union warships, Union guns firing at point-blank range finally blew a hole in *Tennessee's*





armor and she surrendered. The battle of Mobile Bay was over. The three Confederate forts were surrendered some weeks later. The last Confederacy port available to blockade runners, Wilmington, North Carolina was taken in early 1865.

In reviewing the fate of coastal fortifications during the conflict, Congress decided by the late 1860s that masonry forts were no longer viable in an age of rapid technological advances in seagoing platforms. Although some work on coastal forts continued for several decades, in the three decades following the Civil War, the Navy assumed much of the “defense of United States ports” missions once assigned exclusively to the Army.



*Ships against fort: Target plan of the Union Navy pre-amphibious assault bombardment on Fort Fisher guarding Wilmington, North Carolina, 13-15 January 1865. The diagram was drawn following the battle based on after-action reports.*

## Defeat of the Commerce Raiders

Not until 1864 were the two most famous Southern commerce raiders, *Alabama* and *Florida*, sunk. *CSS Alabama*, the most successful of all Confederate commerce raiders had begun its career in August 1862 under the command of Captain Raphael Semmes, a former Union naval officer and lawyer. Under his command *Alabama* sailed more than 75,000 miles, from Galveston, Texas, across the South Atlantic

and Indian Oceans to Singapore and the South China Sea. In her commerce-raiding career of 22 months, *Alabama* captured 65 Union merchant ships and burned 52 of them at sea. Total damages inflicted on the American merchant marine were in excess of \$4 million, 20 times the cost to the Confederacy of buying *Alabama* from her British builder. This highlighted the continuing importance of a seagoing navy to protect trade.

The U.S. Navy finally cornered *Alabama* in the port of Cherbourg, France, in June 1864. *USS Kearsarge*, a steam-powered sloop of war carrying two 11-inch Dahlgren pivot guns, mounted three times the broadside firepower of *Alabama*. After 90 minutes of exchanging broadsides in ever decreasing circles, superior Yankee firepower devastated the *Alabama*. This action demonstrated the superiority of heavy, long-range guns, leading eventually to the concept of the armored battleship.

*CSS Florida's* career in commerce raiding was nearly as illustrious as *Alabama's*. In a seven-month cruise begun in March 1864, *Florida* captured 36 merchant ships, from 50 miles off New York harbor to the waters off Brazil's coast. The cost in lost cargos was about \$4 million, only slightly less than that of *Alabama*. In October 1864 *Florida* was anchored in Bahia, Brazil. The Union steam sloop *USS Wachusett* was also moored in the same port. After three days of fruitless negotiations with the Brazilian government, the local U.S. consul ordered the captain of the *Wachusett*, Napoleon Collins, to disregard international law in a neutral port and ram *Florida*. Collins obeyed his orders, and getting underway, rammed the *Florida* broadside, crushing her starboard bulwark and snapping her mizzen mast. The violation of international law forced the United States government to apologize to Brazil, but the loss of *Florida* along with *Alabama* was a near mortal blow to Confederate commerce raiding.

## Alfred Thayer Mahan and the Creation of a Global Navy

Two decades after the end of the Civil War, the Navy developed new types of ships and operational concepts. Steel had replaced iron, and the first steel ships in the Navy, referred to as the “ABCD ships” (the cruisers *Atlanta*, *Boston* and *Chicago*, and the dispatch boat, *Dolphin*) were funded in the administration of President Chester Arthur in 1883. By the end of the decade, both Republican and Democratic politicians favored building a stronger, modern Navy, to assert America's arrival on the world stage as a great power. Modern warships that equated to jobs in the shipbuilding and iron and steel industries were easily understood by the American public. But the rationale for building a modern Navy, and how it would be employed, had to be provided by the Department of the Navy. In Secretary of the Navy Benjamin Tracy and Captain Alfred Thayer Mahan, the Navy found a Secretary of the Navy and a naval officer who could make the case to the American public, and in the case of Mahan, the world at large.

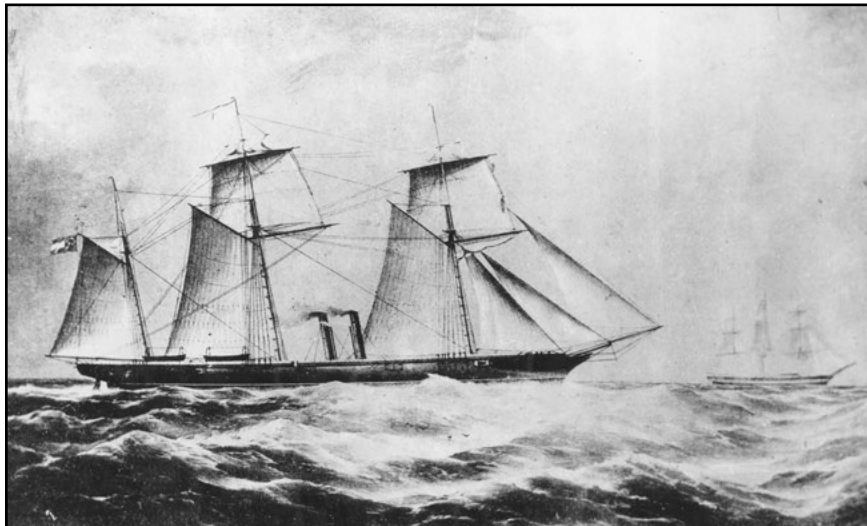
Tracy explained to Congress that the Navy would have missions well beyond coastal defense and commerce raiding. The Navy Secretary argued that America required armored battleships to engage a hostile fleet of modern warships. These new ships





needed to be capable of more than just defense. They had to, if required, be able to conduct a naval war that while “defensive” in principle, would also be “offensive” in terms of its operations.

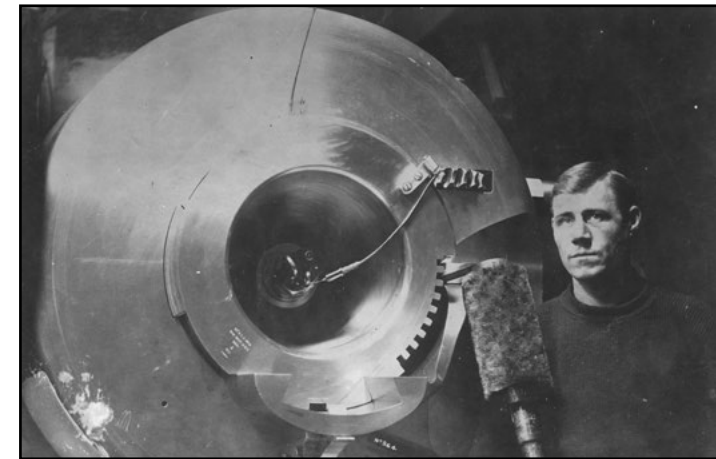
Secretary Tracy reported to Congress that he had ordered the “ABCD ships” to form a “Squadron of Evolution” to explore new tactics, techniques, and procedures that a modern navy must possess. He had directed the newly established Naval War College to draw up plans for Fleet exercises that considered battle-line engagements similar to European navies, rather than the single-ship engagements common in the Revolution and War of 1812. He also proposed that both an “Atlantic Fleet” and a “Pacific Fleet” be created.



*Contemporary sketch of CSS Florida overhauling and capturing the merchant ship Jacob Bell in the West Indies, 12 February 1863.*

Benjamin Tracy’s views on the Navy’s role were echoed in literary form by Captain Mahan, whose book *The Influence of Sea Power Upon History, 1660-1783*, first published in 1890, remains more than a century later one of the most influential works on history and strategy. Mahan would subsequently write 21 books on international history in a maritime context.

Mahan considered national seapower to be comprised of seaborne commerce as well as weapons of war. He argued that navies were critical to protect trade and to interdict an enemy’s trade. As Mahan concluded: “Control of the sea by maritime commerce and naval supremacy means predominant influence in the world... [and] is the chief among the merely material elements in the power and prosperity of nations.”



*Development of naval technology: Gunner's Mate poses by the breech of a 13"/35 gun in USS Oregon (BB-3) circa 1898.*

## War with Spain

In the mid-1890s, tensions with Spain over their colonial policy in Cuba led the Office of Naval Intelligence and the Naval War College to draft plans for the employment of the Navy in advent of war. Included in planning considerations were the Navy’s roles in destroying Spanish naval forces in the Caribbean, landing troops on Cuba and Puerto Rico, and in the Pacific, attacking the Spanish Philippines.

President McKinley hoped that negotiations with Spain might be concluded peacefully, but that proved impossible once the coastal battleship *USS Maine* (ACR-1) blew up in Havana harbor, Cuba, on February 15, 1898. More than 250 sailors lost their lives from a total ship’s complement of more than 370. Popular opinion held that local Spanish authorities had set off an external mine to destroy the American warship. When an official Navy Court of Inquiry concluded that an external explosion had detonated one of *Maine*’s magazines, the United States declared war on Spain.

The Spanish-American War was unique amongst America’s conflicts in that it was primarily fought as a naval war. Virtually the entire Navy, other than the Asiatic Squadron, sailed to the Caribbean Sea at war’s commencement, blockaded Havana harbor, bottled up the Spanish fleet in the port of Santiago, and eventually destroyed them in battle. On the other side of the world, Commodore George Dewey commanding the Navy’s Asiatic Squadron destroyed the Spanish warships in Manila Bay.

The Spanish-American War was brought to an official close by treaty in December 1898. Most of Spain’s remaining overseas empire was ceded to the protection of the United States including Cuba (soon to become an independent nation by order of Congress), Puerto Rico, the Philippines, and Guam. This war showed the ability of naval forces to deny an adversary access, act on a global scale, and project power ashore.

## President Theodore Roosevelt and the Great White Fleet

In September 1901, Theodore Roosevelt became 26<sup>th</sup> President of the United States. He accepted Mahan's belief in the offensive nature of naval forces, their flexibility in employment, and their utility as a tool of national power wherever and whenever the commander-in-chief decided. In public, Roosevelt's advocacy of the Navy was frequently expressed in terms of peace: "A good Navy is not a provocative of war. It is the surest guaranty of peace." In private, the President shared the concern of several of his advisers over the growing maritime power of Imperial Japan.



*Newspaper illustration of the Great White Fleet being welcomed in Sydney Australia, 20 August 1908.*

In 1907 the President conceived an idea that would serve several purposes: steam America's Navy around the world. Such a voyage would show the American people what manner of Navy they had purchased, acquaint the West Coast with the Navy's battleships, most of which were based in Atlantic ports, impose a rigorous test on the Fleet to see what weaknesses and shortcomings in ship design and operation might be determined, announce America's intent to become a Great Power in international politics, and indicate to Japan that the American Navy was capable of steaming to, and defending, the Philippine Islands. It was also a different approach to the post-Civil War deployment pattern of U.S. warships in which a relatively few were homeported overseas in permanent stations (the Asiatic Squadron in Chinese waters being the largest), while the majority of the Fleet was kept in home waters and the most powerful ships retained in the Atlantic.

On December 16, 1907, 16 battleships got underway for a cruise that would take them first to ports in Trinidad, Brazil, Chile, Peru, Mexico, and San Diego, Monterey, Santa Cruz, and San Francisco, California. After a three-month stay on the West Coast, including visits to Seattle, Bellingham and Tacoma, Washington, on July 7, 1908, the Fleet got underway for Hawaii, then the Asia-Pacific region. Along with other countries, it made port visits in Japan.

One of President Roosevelt's principal goals in ordering the Fleet to steam around the world was soon achieved. Diplomatic tensions between the United States and Japan were eased and feelings of friendship between the two navies were established that would last for two decades.

The Great White Fleet steamed south and east, through the Indian Ocean, through the Suez Canal and into the Mediterranean, making numerous port visits along the way.

While in Egypt news was received that a devastating earthquake had struck Messina, Italy, on the island of Sicily. Two battleships, *Connecticut* (BB-18) and *Illinois* (BB-7), and two auxiliary vessels were dispatched immediately to render assistance to the victims. Two other ships not part of the Great White Fleet were later ordered to relieve *Connecticut* and *Illinois* so the two battleships could rejoin the Fleet on the final leg of its voyage from Gibraltar to Hampton Roads. On February 22, 1909, the Great White Fleet passed in review before President Roosevelt in Hampton Roads just weeks before the end of his term in office.



*Presidential welcome: Standing on a gun turret, President Theodore Roosevelt addresses the sailors of USS Connecticut (BB-18) following their return from the round-the-world cruise, 22 February 1909.*

## Naval Innovation: Development of the Submarine

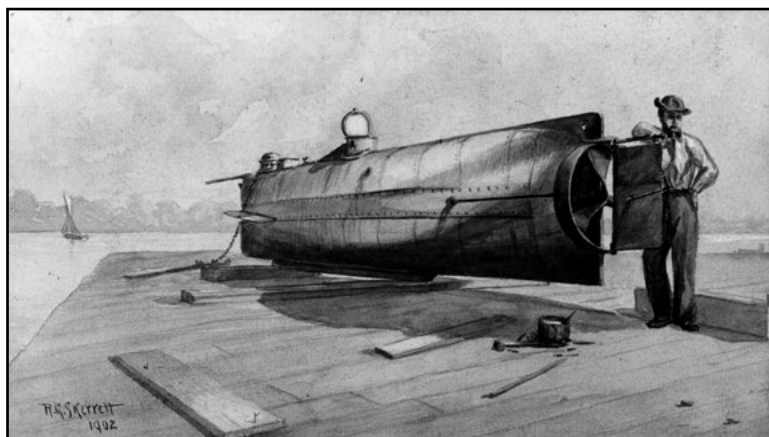
The development of the submarine presents an interesting case-study on how technology has always been a key characteristic of naval warfare, and why the U.S. Navy must retain the attribute of being open to technological change. Individual technological developments may have an even greater effect on naval war fighting





than war on land, since usually only a comparatively small number of ships can be built and put to sea. On land, it is possible for large numbers of troops or weapons to overwhelm forces that are technologically advanced. At sea, this is much more difficult because of the fewer number of units involved and the increased mobility of warships. For example, a relatively small number of technologically advanced submarines have historically had a major effect on naval warfare.

The United States Navy was among the first to experiment with a submersible craft. The Colonial Navy attempted an attack on British warships with the single-man submersible *Turtle*. In the Civil War, two submersible craft, *Alligator* and the *Intelligent Whale*, were built as experimental craft for the Union Navy. On the Confederate side, the *CSS H.L. Hunley* sunk a Union warship, sloop-of-war *USS Housatonic*, in Charleston harbor on February 17, 1864, the first submarine to ever sink a warship. Shortly after the attack, the shock of the explosion severely damaged *Hunley* and she was lost with all hands.



Contemporary sketch of *CSS Hunley*, 1864.

In the early 1880s, technology in the form of the internal combustion engine and lead-acid storage battery permitted undersea craft to become genuinely submersible platforms as opposed to their semi-submersible predecessors. The “automobile” torpedo, had been available since 1866, invented by a British engineer; this mobile torpedo gave real war fighting value to the submarine.

John Holland, an Irishman who had immigrated to the United States in 1873, developed the first practical submarine. After several prototypes, the Navy was satisfied and in October 1900 purchased the craft and commissioned it *USS Holland* (SS-1).

Initially, the intent was to employ submarines close aboard the battle line (warship fleet) in a defensive posture. Unfortunately, several exercises pointed to the *Holland's* inability to keep up with the speed of the battle line. It was concluded that submarines could be employed in harbor and coastal defense

missions. Other submarines were purchased to focus on specific missions such as sowing mines and cutting underwater cables on the oceans floor.

Other countries also built submarines. In 1914, the American submarine force of 35 boats ranked third in the world in terms of numbers, trailing Great Britain (77) and France (45). Germany had 29 U-Boats. But numbers were deceiving. Both the American and British submarines were underpowered and prone to failure.

By comparison, German diesel technology had kept pace with the increased size and payload of their boats.

As World War I commenced, the Navy's submarine force was limited to coastal patrol and harbor defense missions. In contrast, the German U-Boat campaign in the Atlantic was offensive in nature, and the Navy recognized that it was witnessing a historic shift in combat capability at sea. Now submarines were useful for sea control, SLOC protection, and interdiction, not just harbor defense.



Submarine *Holland* hauled out of water at Greenport, Long Island in the summer 1899. It would be commissioned into the U.S. Navy in the following year.

In 1915, the focus of German U-Boats attacks was shifted from warships to merchant ships, without warnings being given to the intended targets. The 29 German U-Boats sank 555 Allied merchant ships. As more German submarines were built and put to sea, Allied merchant ship losses climbed to almost 1,300 hulls in 1916. The Allies were desperate to find some countermeasure to the U-Boat menace. Underwater sound detection devices, development of depth charges, and employment of aircraft patrols over the approaches to British and French ports were utilized, but proved unable to stem the increasing losses. What did prove effective was the institution of the convoy system. Assembling large numbers of merchant ships into convoys escorted by warships and shadowed by aircraft overhead when close to land air bases significantly reduced Allied ship losses.

In the late 1920s, a consensus was slowly building concerning the proper role of U.S. submarines. Over a series of Naval War College games and Fleet Battle





Problems, U.S. submarines began to be given more offensive missions, operating individually or in groups.

In the 1930s, new submarines capable of long distance and independent operations in the Western Pacific, were built with a cruising radius of 11,000 nautical miles at 10 knots and a top surface speed of 16.5 knots. These boats would become the basis for the *Gato* and *Balao* Classes of “fleet” submarines of World War II that would operate forward in Japanese-controlled waters against warships and commerce.

### Naval Innovation: Experimentation and Rise of Carrier Aviation

The concept of the aircraft carrier dated from 1909, the year the Army purchased the first airplane intended for military employment. That year the Navy sent two officers to witness Orville Wright demonstrate his aircraft to the Army at Fort Myer, Virginia. In 1910 an officer within the Secretary of the Navy’s office, instructed to keep apprised of aviation issues, recommended that the Navy attempt to fly an airplane from a ship. In November 1910, cruiser *USS Birmingham*, with an 83 foot-long wooden platform installed on her bow, anchored in Chesapeake Bay and launched a privately owned aircraft, piloted by Eugene B. Ely into the wind. Ely flew the aircraft for almost three miles before landing at Willoughby Spit near Norfolk, Virginia.

In January 1911, the armored cruiser *USS Pennsylvania*, modified with a 119 ft. long wooden platform over the after gun turret successfully recovered an aircraft flown by Ely in San Francisco. The arresting gear to stop the aircraft on landing was comprised of manila lines attached to sandbags. The aircraft was fitted with three pairs of hooks to grab the lines. In a report to the Navy Department, the commanding officer of *Pennsylvania* stated that the launch and recovery of an aircraft on his ship “assured the importance of the airplane in future naval warfare.” The primary missions then envisioned for naval aircraft were scouting and reconnaissance, and spotting for battleship gunnery; strike missions appeared too difficult with the aircraft of the day.

The Navy was impressed with the potential of taking aircraft to sea and in March 1911 requested funding from Congress to buy two aircraft.

By 1914, the Navy had an inventory of 12 aircraft. Flying from battleship *USS Mississippi* and cruiser *USS Birmingham*, naval aircraft were used to conduct reconnaissance missions over the Yucatan Peninsula during the intervention in Vera Cruz, Mexico ordered by President Wilson.

In 1915 the captain in charge of aviation matters for the Secretary of the Navy suggested that the Navy consider buying and converting a merchant ship to specifically carry aircraft. He also requested an investigation be conducted into the feasibility of launching aircraft from ships equipped with catapults. The Secretary forwarded the request to the Navy’s General Board, Flag officers who advised him on policy matters, but with attention focused on World War I, no

action was taken.

In Europe, by 1918 the Royal Navy had converted several ferries and merchant ships to launch and recover aircraft. It was also building four ships from the keel up as aircraft carriers.



Eugene Ely conducts the first landing on a surface vessel on *USS Pennsylvania* in San Francisco Bay, 18 January 1911.

When the armistice with Germany was announced in November 1918 ending World War I, the Navy was in the process of fitting wooden launch platforms on to a large number of its battleships. The use of the catapults to propel aircraft off ships led to sea planes being assigned to 18 battleships and a large number of cruisers over the next several years. A mid-1919 request to Congress for funds to convert a collier (coal resupply ship) into an aircraft carrier was approved. The ship entered Norfolk Navy Yard in March 1920 and two years later, *USS Langley*, the Navy’s first aircraft carrier, was commissioned. With a maximum speed of 15 knots, *Langley* was six knots slower than the battleships she was intended to operate with. She operated as an experimental platform to develop tactics, techniques, and procedures for the launch, handling, and recovery of naval aircraft.

After a two year period as an “experimental” ship, *Langley* reported to the Battle Fleet in San Diego in November 1924. In January 1925, a squadron of Chance Vought VE-7S fighters, biplanes made of wood and mounting one fixed forward-firing machine gun and one flexible machine gun in the rear cockpit was embarked to begin the carrier qualification process.

In the Fleet Battle Problem for 1926, ordnance salvos from battleships were complemented by a 16-plane launch from *Langley*’s flight deck, a record for naval aviation at the time. A year later, in the Fleet Battle Problem for 1927, an aircraft “strike” (simulated) from *Langley* “destroyed” land-based Army fighters protecting the western end of the Panama Canal. Two planes from *Langley* then continued east to Balboa, far beyond the range of the battle line’s guns, and “bombed” the canal. Long range strike from aircraft carriers operating with the battleline was now a reality.



Due to its ability to embark different types of aircraft, the Navy's first aircraft carrier proved itself to be a general purpose ship, capable of executing a large number of missions: scouting, spotting, air superiority, long range strike, anti-surface, and anti-submarine warfare.

The 1928 Battle Problem focused on an attack on, and defense of, the naval base at Pearl Harbor, Hawaii—presaging the Imperial Japanese attack in 1941. Before dawn on May 17, 1928, *Langley* launched a 35 aircraft strike off its flight deck in seven minutes. At daybreak the planes were over Honolulu, and conducted a surprise attack on Navy and Army installations. The F2B fighters were more

maneuverable than the defending Army aircraft, and easily outfought attempts to defend the base.

*USS Lexington*, commissioned on December 14, 1927, joined *Langley* in Pearl Harbor in May 1928. Her maximum speed of 33 knots was more than twice that of *Langley*, and 12 knots faster than the fastest battleship; she made the 2,200 mile voyage from San Diego to Pearl in little more than three days. In 1929, *USS Saratoga*, the Navy's third carrier, also conducted a simulated attack on the Panama Canal. Admiral William V. Pratt,



Painting of *USS Saratoga* (CV-3) launching its air wing of biplanes.

commander of the battle force, termed the carrier's strike on the Panama Canal "the most brilliantly conceived and most effectively executed naval operation in our history." In 1930, Pratt became Chief of Naval Operations and directed that aircraft carriers be assigned an offensive role in all future Fleet Battle Problems.

Thus, a dozen years before the U.S. Navy actually went to war, it was well understood within the Navy that the essential nature of war at sea had changed and that future operations would require naval aviation as an essential part of the Fleet.

### Naval Innovation: Amphibious Warfare

With the disastrous amphibious landing by Franco-British forces at Gallipoli in 1915 still fresh in the minds of most post-World War I generals and admirals, amphibious warfare was deemed "too difficult" to be successfully executed in "modern" warfare. But many in the United States military rejected this conventional wisdom, and foresaw a future need, in a war with Japan across the Pacific Ocean, to assault and seize territory for air and naval bases.

In 1920, Marine Corps Commandant Major General John Lejeune directed Lieutenant Colonel Earl Ellis to determine what would be required to conduct a

series of amphibious assaults across the Pacific in support of "War Plan Orange," the Army-Navy contingency plan for war against Japan. Ellis, who had studied successful amphibious operations in history, produced Operations Plan 712, "Advanced Base Force Operations in Micronesia." The plan called for specialized ships and training, as well as development of a comprehensive amphibious operations doctrine. The result was the "Tentative Manual for Landing Operations," a detailed look at all aspects of amphibious operations. In 1935, the Navy Department adopted the "Manual" as the basis for all future amphibious force equipments and research and development efforts. Later *Fleet Training Publication 167*, "*Landing Operations Doctrine, USN*" became the official doctrine for Navy/Marine Corps amphibious landings throughout World War II.

At the same time, a series of Navy-Marine Corps exercises in Puerto Rico and Hawaii began to test and evaluate amphibious operations concepts. Throughout the 1930s, the Navy and Marine Corps worked to solve such operational problems as getting assault troops from their transport ships to assault landing craft, bringing significant heavy equipment to the beachhead to penetrate shore defenses, controlling fire support from ships offshore, and providing close air support. The design and construction of assault craft and amphibious warships followed, although specialized warships specifically built to conduct amphibious operations would not arrive on the waterfront until 1942. These were critical requirements for victory in World War II.

### Start of World War II

The rise of Nazi Germany and Fascist Italy in the 1930s, and the beginning of World War II in September 1939, forced a revision in the basic U.S. contingency war planning—War Plan Orange—that had focused on a possible war in the Pacific against Japan. By mid-1940, Great Britain's defeat at the hands of Germany was possible, which posed a serious risk to American strategic interests in the Western Hemisphere. The U.S. Joint Army and Navy Board began to consider the likelihood of a two-ocean war, in which Japan would be aligned with Germany and Italy. If such an event were to occur, the Board agreed that the European adversary posed the greater threat to the United States. War in the Pacific, if it came at all, would have to be a holding action until the European adversary was defeated.

When the Japanese attacked Pearl Harbor without a declaration of war, neither the American political leadership nor the public was content to remain in a defensive posture in the Pacific until Germany was defeated. (Germany and Italy declared war on the United States after the Pearl Harbor attack.) In calling December 7, 1941, a "day of infamy," President Roosevelt accurately captured the sentiment of the American people. The task for the U.S. Navy was to fight on both sides of the world simultaneously. It was the Navy's first intense two-ocean war.





## War Against the U-Boats

Upon the outbreak of World War II in Europe, the principal mission of the German U-Boats became the destruction of seaborne commerce destined for Great Britain. Their impact was immediately felt. By the summer of 1940, with France defeated and occupied by the German army, the U-Boats shifted their operating bases to the French Atlantic coast. British losses continued to mount as the U-Boats now had a considerably easier time gaining access to the open sea. Dozens of merchant ships fell prey to submarine attack.

When the United States entered the war, Germany shifted U-Boats to operating areas off the American east coast and in the Gulf of Mexico. In only 10 days, 25 ships and more than 200,000 tons were sent to the bottom. In 1942, shipping losses totaled nearly 6.5 million tons.

Following an Allied meeting to discuss dividing up geographic responsibilities for convoy operations, the Chief of Naval Operations, Admiral Ernest King, assigned top priority to anti-submarine warfare (ASW) in the Atlantic. The Tenth Fleet was created, with authorization to take operational control of whatever forces were required to defeat the U-Boat threat. The CNO also put particular emphasis on Navy access to all government agencies, specifically both national and Allied intelligence sources. An Anti-Submarine Warfare Operational Research Group was established and charged with monitoring new technologies and exploring new tactics for employment against the U-Boat.

In melding all-source intelligence with operational control of ships and long range patrol aircraft, the Tenth Fleet began to show results. A High Frequency/Direction Finding (HF/DF) network composed of shore-based and ship-mounted antennas was able to detect the radio transmissions of German U-Boats and provide location data to an increasing number of destroyers and destroyer escorts, as well as a new ship type in anti-submarine warfare: the escort aircraft carrier (CVE). This was one of the first uses of the electro-magnetic spectrum as a war fighting domain. Carrying up to 30 aircraft specialized for the anti-submarine warfare mission, CVE task groups turned the tide in the Battle of the Atlantic.

From Pearl Harbor to Doolittle Raid

The Imperial Japanese Navy leadership recognized that Japan had little chance of defeating the United States in a protracted conflict. The size and strength of

the American industrial base would allow it to win an extended war of attrition.

However, Japanese military leaders assumed that if a surprise attack on Pearl Harbor gained Tokyo a six month advantage while America struggled to fight a two-ocean war against both Japan and Germany, this would be sufficient time to consolidate their gains in the Pacific. By then, a strong defensive perimeter, what would today be considered an anti-access network, could be established in the Pacific. Japanese military leadership then supposed that America would decide to concentrate its war effort against Germany and settle for a negotiated peace with Tokyo. But they seriously miscalculated America's resolve.

On April 18, 1942, 16 U.S. Army Air Force B-25 medium bombers, launched from the flight deck of *USS Hornet* (CV-8), bombed Tokyo and four other major cities. The attacks caused little damage, and most of the bomber squadron ran out of gas and crash landed in occupied China, with many of the crews smuggled to safety behind Nationalist Chinese lines by peasants. But news of the raid was received in the United

States with great enthusiasm. More than physical damage, the Doolittle raid was a severe psychological blow to the Japanese people, who believed their homeland would be immune to attack. It also embarrassed the Japanese military. Their naval leadership, with the grudging support of the army, decided the outer perimeter of the Japanese Pacific empire needed to be secured. This required capturing Midway Island in the Central Pacific and the Aleutian Islands off Alaska in the northern Pacific.



Contemporary poster symbolizing American determination following the Pearl Harbor attack.

## From Coral Sea to Midway

In 1942, the Battle of the Coral Sea was fought to prevent a possible Japanese attack on Australia following their invasion of New Guinea, 300 miles north of Australia.

### Historical Vignette: Battle of Coral Sea.

In April 1942 the Japanese commenced military operations against Australia. Forces were dispatched to occupy the Solomon Islands and Port Moresby, New Guinea, spearheaded by two carriers that had supported the Pearl Harbor raid, *Shokaku* and *Zuikaku*. By this time the U.S. Navy had broken the Japanese naval code and the Pacific Fleet commander ordered Rear Admiral Frank Jack Fletcher to take carriers *Lexington* (CV-2) and *Yorktown* (CV-5), join a force of cruisers and destroyers from the Royal Australian Navy, and intercept the Japanese force



Panoramic view of the destruction at Pearl Harbor, 7 December 1941.





steaming towards New Guinea.

On May 4 aircraft from Yorktown attacked Japanese forces in the Solomons, sinking a destroyer and several supporting merchant vessels. Efforts by both opposing carrier groups to locate one another were hampered by bad weather and cloud cover. Finally, on May 6, Army Air Force bombers sighted the New Guinean invasion force. Fletcher launched a strike the following day which attacked the Japanese troop transports and the light carrier Shohu. Japanese aircraft, searching in vain for the American carriers, did find a destroyer and an oiler which had been mistakenly identified as a carrier and a cruiser. Visibility was so bad the night of May 7<sup>th</sup> that several Japanese aircraft tried to land on Yorktown, believing it was their own carrier.

The following morning, both forces launched air strikes without a firm idea of the location of their targets. Japanese fleet carrier Zuikaku succeeded in hiding in a rainstorm, but American aviators eventually found Shokaku and left her on fire and unable to recover aircraft. The Japanese strike, enjoying better weather, found Yorktown and hit it with a single bomb that caused extensive damage. Lexington was hit by two torpedoes and two bombs. Damage control efforts were succeeding when "Lady Lex's" gasoline tanks exploded and the carrier was subsequently scuttled.

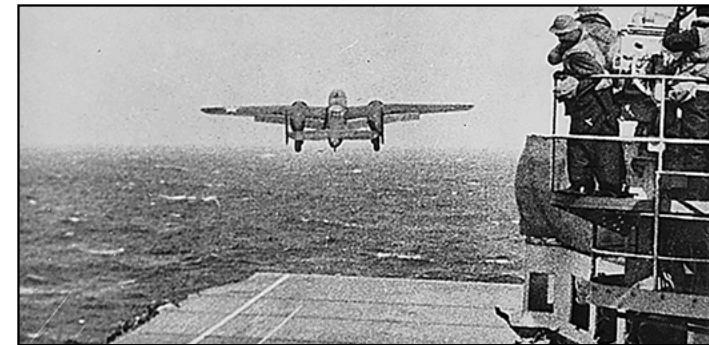
After the May 8 engagement, both forces withdrew and the intended invasion of Port Moresby was cancelled. Although the Japanese only lost light carrier Shohu, while the U.S. Navy lost Lexington and Yorktown was badly damaged, many Japanese pilots, unable to land on the badly damaged Shokaku, were lost at sea. The cost in well trained and experienced Japanese pilots at Coral Sea began a drain on Japanese aviators that would have fatal consequences two years later.

While a tactical victory for the Imperial Japanese Navy, the Battle of Coral Sea was the first check to Japanese military operations since December 1941. It was considered a strategic victory for the U.S. Navy. It was also unique as the first engagement ever fought at sea where opposing ships never sighted one another. It was a battle fought solely with carrier-launched aircraft, and signaled a fundamental change in war at sea.

Following the Battle of Coral Sea, the Japanese believed that both American carriers involved in the battle, Lexington and Yorktown, had been sunk. The way was open for a thrust into the central Pacific, aimed at drawing the remaining U.S. Pacific Fleet units out to sea where they could be destroyed in a final, climactic sea battle. But unknown to Japanese leadership, Yorktown had not been sunk, and emergency repairs would be sufficient to send her to sea again.

Equally important, the code-breakers at Pacific Fleet headquarters in Hawaii were monitoring Japanese radio communications and determined that Midway was the objective. On May 21, convinced that his intelligence was correct, Admiral Nimitz ordered Enterprise (CV-6), Hornet (CV-8), and the just-repaired

Yorktown (CV-5) to sail west to counter the Japanese thrust towards Midway Island. The Japanese force sought a decisive battle in which the remaining U.S. Fleet in the Pacific could be destroyed. Instead, by June 5, the Japanese force that had sought that final battle with the Navy was in full retreat. Their loss at Midway, and specifically four front-line carriers and their highly-trained air crews, was a defeat from which the Imperial Japanese Navy would never recover. The strategic initiative passed from Tokyo to Washington. The Navy would no longer be simply reacting to Japanese military operations. Planning began for a resumption of offensive military operations; destination: Tokyo.



Army B-25 taking off from USS Hornet (CV-8) to conduct the Doolittle Raid, 18 April 1942.

### Historical Vignette: Battle of Midway.

Intent on drawing the U.S. Pacific Fleet into a decisive naval battle, in June 1942 the Imperial Japanese Navy under the overall command of Admiral Yamamoto executed a complex operation ranging from diversionary attacks in the Aleutians to closing on the American-held atoll of Midway, 1,100 miles northwest of Pearl Harbor.

Thanks to superb code and analytical work by intelligence officers on his Pacific Fleet staff, Admiral Nimitz knew that the attack on the Aleutians was a diversion. Intelligence work was also able to determine that Midway was the destination and intent of the Japanese main force of four carriers, carrying 248 aircraft, nine battle-ships, six cruisers, and 25 destroyers. The information was largely the product of signals intelligence—interception and decoding of Imperial Japanese Navy radio communications—again demonstrating the importance of the electro-magnetic spectrum, intelligence, and cryptography to naval operations.

Seven months after Pearl Harbor, Nimitz took what he termed a "calculated risk" in dispatching most of the remaining striking power of the Pacific Fleet against the Japanese force. Two carrier task forces, comprising three carriers, eight cruisers, 15 destroyers, and 233 carrier based aircraft sortied from Pearl Harbor to take up a position northeast of Midway Island. Aircraft carriers Enterprise (CV-6) and Hornet (CV-8) sailed under the command of Rear Admiral Raymond Spruance. Carrier Yorktown (CV-5), her battle damage substantially repaired in only three days, followed



shortly thereafter under the command of Rear Admiral Frank Jack Fletcher, recently returned from Coral Sea. Admiral Fletcher was in overall command

The Japanese thought Yorktown had been sunk at Coral Sea and had no idea that the American carriers had left Pearl Harbor and lay in waiting. Fletcher and Spruance, based on the intelligence gathered by the Pacific Fleet staff, knew the approximate location of the Japanese, but needed more definite locating information to launch air strikes.

The battle commenced on the morning of June 4 with a Japanese air strike on Midway. The damage inflicted was considerable, though the airfield was still operational. Navy and Army Air Force land-based planes, alerted by radar of the inbound Japanese aircraft, had been launched prior to the strike's arrival. But they were ineffective in attacking Japanese ships and suffered heavy losses.

Returning Japanese aircraft as well as reconnaissance aircraft reported sighting American warships, but only one was identified as an aircraft carrier. Knowing that they had been sighted and assuming the element of surprise was gone, Fletcher and Spruance immediately launched their air strikes in a rushed and uncoordinated fashion. Aircraft squadron leaders were given only the general direction, based on scout plane reports, in which the Japanese force was thought to be located. Once airborne, they immediately began to search for the enemy.

Torpedo bombers from Hornet were the first American aircraft to find the Japanese carriers. Despite having no fighter cover, they immediately launched an attack. Tragically, all 15 slow-flying Devastator aircraft were destroyed by Japanese Zero fighters and anti-aircraft fire. No hits were scored on the enemy carriers, but the Japanese force had finally been located.

Two squadrons of dive-bombers from Enterprise and fighters and dive-bombers from Yorktown found the Japanese force at 1020. While Yorktown's Wildcat fighters took on the defending Zeros, dive-bombers from Yorktown and Enterprise attacked the four aircraft carriers below.

The flight decks of the Japanese carriers were packed with planes, ordnance, and charged fuel lines. Indecision as to whether to re-arm their aircraft with torpedoes to attack ships or bombs to attack Midway's installations had left the Japanese carriers particularly vulnerable. The American attack took little more than five minutes. Akagi, Kaga, and Soryu, all Pearl Harbor veterans, were left burning wrecks.

A Japanese counter strike from their one remaining operational carrier Hiryu, followed returning American aircraft and inflicted serious damage on Yorktown. In retaliation, dive-bombers from Enterprise responded by setting the last Japanese carrier afire. Hiryu would later sink after repeated attacks from Navy aircraft and Army Air Force B-17s flown from the hastily repaired runway on Midway.

Although initial damage control efforts were thought sufficient to save Yorktown, on June 6 she was sunk, along with a destroyer alongside, by a Japanese submarine. American air and submarine forces would pursue the retreating Japanese force over the next two days, sinking a heavy cruiser.

Almost from the first battle reports received in Pearl Harbor and Washington,

Midway was perceived then, and remains today, one of the truly decisive battles in naval history. The loss of four aircraft carriers, 228 aircraft, and more than 3,000 men, many of them irreplaceable pilots, was a defeat from which the Imperial Japanese Navy would never recover.

The next offensive operation in the Pacific War would be American, not Japanese. The perilous journey to Tokyo and final victory had started. The tide had turned.

## Submarine War Against Japan

Symbolic of the importance of submarines to the Navy in the aftermath of Pearl Harbor, on December 31, 1941, Admiral Chester Nimitz took command of the Pacific Fleet on board USS *Grayling* (SS-209). About the only opportunities available to the Navy in the Pacific in the immediate aftermath of the Pearl Harbor disaster were carrier air raids on isolated Japanese-held islands and submarine warfare. The order was given "execute unrestricted air and submarine warfare against Japan" only six hours after the attack on Pearl Harbor.

Reliance on submarines pointed to the importance of advances in naval technology. However, the submarine force was initially plagued by faulty torpedoes. Pre-war budget constraints had restricted firing of live ordnance, and problems with torpedo detonators only became evident when torpedo warheads failed or exploded prematurely. Upon returning from patrol, submarine captains pressed for more reliable and larger warheads and torpedoes capable of being fired at shallower depths.



USS *Cuttlefish* (SS-171) firing torpedo. Combat art by Harrison Miller, 1942.

Complementing better weapons was a change in submarine tactical doctrine through a series of "Tactical Information Bulletins," based on feedback from the Fleet and valuable lessons learned. Merchant ships were now identified as viable





targets for attack and “pack” operations, which were conducted by three or more submarines operating together in mutual support. Submarine commanding officers were advised that “no worthwhile target should be passed up in the hope of securing a better one.”

By the end of the war, U.S. Navy submarines had sunk approximately 200 warships, 30 percent of the entire Japanese fleet, and more than 1,300 merchant ships, denying the Japanese industrial base the raw materials it needed to produce the weapons of war.

Submarine warfare was costly. Fifty-two submarines (18% of the force) and 3,507 submariners were lost during the Pacific War, the highest casualty rate of any branch of the U.S. armed forces in the war.

Submarine warfare was effective. A post-war report by the Joint Army-Navy Assessment Committee concluded that “the war against shipping was perhaps the most decisive single factor in the collapse of the Japanese economy and logistic support of Japanese military and naval power. Submarines accounted for the majority of vessel sinkings and the greater part of the reduction in tonnage.”

### Amphibious Assaults on Islands

In the summer of 1943, the American and British leadership agreed that the next step in the war in the Pacific was to begin offensive operations in the Central Pacific, with the ultimate goal of destroying the Japanese ability to wage war in the waters off their home islands. The axis of advance would be along the Gilbert, Marshall, and Marianas Islands, bringing Japan within range of the new B-29 bomber flown by the Army Air Corps. The distances involved were large and logistics support from either Hawaii or Australia was not feasible; the Navy would have to bring its own logistics support. With no bases in close proximity, air support for the assault would have to be supplied by Navy planes flying from aircraft carriers operating offshore, subject to air, surface, and undersea attack from a fanatical, well-armed and trained enemy.

Terrible losses at Tarawa, the first offensive amphibious assault in the Pacific, provided critical lessons for the Navy. While the basic doctrine was sound, lack of an intensive pre-landing bombardment, poor pre-landing assessment of the approach to the beachhead, repeated communications failures, and lack of effective air support indicated substantial areas needing improvement. For sailors on the carriers offshore, the hazards of operating in restricted waters were learned at Tarawa. Seven months later, during the amphibious invasion of the Marianas in 1944, the resultant “Marianas Turkey Shoot” saw 346 Japanese planes shot down, against only 30 American losses during the pre-assault fighting at sea.



*Concentration of WWII carrier airpower: five Third Fleet CVs at Ulithi Atoll anchorage, 8 December 1944.*

### Historical Vignette: Naval Battles for Guadalcanal.

*Following their victory at the Battle of Savo Island, the Imperial Japanese Navy mounted a counteroffensive to retake the island of Guadalcanal in the Solomon Islands and nearby adjoining islands in August 1942. The war in the Pacific shifted from power projection strikes and combat engagement ranges marked in hundreds of miles to a brutal war of attrition. The Japanese objective was to retake Guadalcanal and destroy the American fleet protecting it. The American objective was to prevent reinforcement of the Japanese men and material fighting the U.S. Marines on Guadalcanal. Dozens of ships and hundreds of men and planes were lost by both sides in a series of five interrelated engagements: the Eastern Solomons, August 24; Cape Esperance, October 11-12; Santa Cruz, October 26; Guadalcanal, November 12-15; and Tassafaronga, November 30.*

*In the Battle of the Eastern Solomons, August 24, 1942, two Navy carriers, Enterprise (CV-6) and Saratoga (CV-3), intercepted a force of Japanese carriers, battleships, and cruisers bringing 3,000 Japanese soldiers to reinforce their Guadalcanal garrison. Aircraft from Saratoga sank a Japanese light carrier, but Japanese torpedo- and dive-bombers attacked the American force, inflicting severe damage on Enterprise. The following day, unable to find the American force, the Japanese returned to their base at Rabaul, having failed to land the reinforcements.*

*On the night of October 11-12, the Japanese again moved to reinforce their troops on Guadalcanal using destroyers rather than troop transports. An accompanying force of cruisers and destroyers intended to bombard the Marines' Henderson Field on Guadalcanal also sailed. Intercepted by a Navy cruiser task force off Cape Esperance, the night battle saw an American destroyer and a Japanese cruiser and destroyer sunk. In the darkness and confused maneuvering, both sides mistakenly fired on their own ships. The Japanese were successful*





in landing their troops.

Two weeks later an American task force, including carriers *Enterprise* (CV-6) and *Hornet* (CV-8), went searching for a Japanese force intending to again reinforce their Guadalcanal garrison. Near the Santa Cruz Islands, east of Guadalcanal, both forces located one another and immediately launched air strikes on October 26. The American attack put two Japanese fleet carriers out of action, but the Japanese were more successful. Dive-bombers and torpedo-bombers penetrated the protective screen around the American carriers. *Hornet* was repeatedly attacked and left dead in the water and on fire. *Enterprise*, initially hidden in a rain squall, was subsequently found and also attacked, suffering serious bomb damage. With both American carriers badly damaged, many returning pilots had to ditch in the surrounding waters, to be rescued by destroyers. *Hornet* eventually sank and *Enterprise* retired east to be repaired again. Temporarily, the United States had no active carriers in the entire Pacific Theater.

Three weeks later, the Japanese tried again, intent on both reinforcing their garrison on Guadalcanal and destroying Henderson Field. A Japanese force of two battleships and 16 destroyers was intercepted by an American force of two battleships, five cruisers, and 12 destroyers in the murky darkness of what by now was known—because of the number of ships sunk—as “Ironbottom Sound.” Action was conducted at close quarters, at ranges more typical of 19<sup>th</sup> century warfare during the Age of Napoleon. Identification of ships was difficult and friendly fire incidents, particularly amongst the American ships, were frequent. Two American admirals, Daniel Callaghan and Norman Scott, were killed aboard their badly damaged flagships. Two American cruisers and seven destroyers were sunk. Japanese losses included a battleship, a cruiser, and three destroyers.

Two nights later the Japanese returned, sending 14 ships to bombard Henderson Field. They were intercepted by an American task force of seven ships, including two battleships, *Washington* (BB-56) and *South Dakota* (BB-57). As usual, the Japanese proved expert at night fighting, and soon four destroyers escorting the two battleships were sunk or put out of action. *South Dakota*, absorbing a pounding that knocked her electrical system out of action, was badly damaged but managed to stay afloat through the skilled damage control efforts of her crew. In the confusing action, *Washington* was able to approach unnoticed and fired a broadside at close range that set the Japanese battleship *Kirishima* afire. The night action ended as the Japanese retreated, leaving their transports packed with reinforcing troops to be destroyed by American aircraft. By November 15, seven transports had been sunk at sea and the remaining four run aground and gutted on the Guadalcanal beaches by air attack, cruiser and destroyer fire, and Marine artillery.

On the last day of November, the Japanese made another attempt to resupply their Guadalcanal garrison, now short of food and ammunition, with a squadron of eight destroyers carrying the necessary supplies. Intercepted by

an American force of five cruisers and four destroyers off Guadalcanal at Tasafaronga, command and control problems, even with radar, largely negated the U.S. Navy's advantage. In another confusing night engagement, all American fires were concentrated on a single Japanese destroyer. The remaining Japanese destroyers, using gun flashes for targeting, fired a devastating salvo of Long Lance torpedoes at the American ships. Three cruisers were damaged and set afire. A fourth cruiser, *Northampton*, was struck by two torpedoes and sank. But the seven surviving Japanese destroyers retreated, never delivering their supplies.

Despite the losses suffered by the U.S. Navy at Tasafaronga, the Japanese failed in their mission to resupply their embattled garrison on Guadalcanal. Faced with the prospects of continuing ship losses, which were increasingly difficult to replace in their struggling wartime economy, the Japanese decided to give up the struggle to retake Guadalcanal, which their high command now referred to as “The Island of Death.” In February 1943, 13,000 surviving Japanese troops of the original garrison of 36,000 were evacuated by destroyers operating under the cover of darkness.

The land, sea, and air battles around Guadalcanal cost the Japanese almost 700 aircraft, 24 warships, and about 30,000 soldiers and sailors. Almost 15,000 Japanese soldiers died of starvation on the island. American losses were 615 planes, 25 warships, 5,000 sailors and 2,500 Marines and soldiers. The battles once again showed how naval forces, by interdicting the re-supply of enemy forces can gain decisive strategic and tactical advantage.

Unlike the combat that preceded it, the seven month Guadalcanal campaign was a war of attrition. Despite their severe losses, Americans could look at U.S. shipyards filled with new construction, aircraft being manufactured in the thousand in an assembly line process similar to automobiles, and a training pipeline able to replace all the pilots who had been lost in combat operations. Conversely, lacking the huge industrial base of the United States, the Japanese military struggled to replace their losses. In their loss of skilled, combat-experienced pilots, the Imperial Japanese Navy suffered a blow from which it would never recover.

The myth of Japanese invincibility at sea and on land was gone. As Admiral Halsey later recounted in his memoirs, “Before Guadalcanal the enemy advanced at his pleasure—after Guadalcanal he retreated at ours.”



Battle of Santa Cruz: USS *South Dakota* (BB-57) engages an incoming Japanese “*Kate*” bomber, October 1942.



## Landings in Europe

The conduct of amphibious landings in the European Theater of Operations was different from the Pacific. With the shorter distances from England and other bases, land-based aircraft dominated the skies.

With the loss of France in 1940, Army planners realized that any return to the European continent would require a massive amphibious assault, the size and scope of which dwarfed those in the Pacific. But like the Navy/Marine Corps approach to amphibious operations in the Pacific, the Army continued to develop and refine its amphibious doctrine.

The first major amphibious operation in the European theater was the Allied invasion of North Africa on 8 November 1942. *Operation Torch* was perhaps the riskiest amphibious assault in all of World War II, with more than 700 Allied ships involved in the operation, sailing 2,800 miles from Great Britain and more than 4,500 miles from Hampton Roads, Virginia through U-Boat infested waters. Along a front that was more than 100 miles long, 116,000 men were landed on 26 beaches in three separate landing areas in Morocco (Eastern Atlantic) and Algeria (Mediterranean). This was followed in July 1943 by the amphibious assault on Sicily, *Operation Husky*; over 2,000 U.S., British and Allied ships were involved landing American and British armies.

Of all the amphibious assaults conducted during World War II by Allied forces, the landing at Salerno, Italy in 1943 came closest to being thrown back into the sea.

With a German counteroffensive seeking to split American and British ground forces, and the loss of local air and sea superiority, General Mark Clark commanding the Allied forces considered evacuating the American troops and re-landing them on a beachhead further north. Eisenhower, responding to Clark's desperate requests, ordered a rapid reinforcement of the naval forces supporting the beachhead. Battleships and cruisers dispatched from the British base at Malta and maximum Allied air effort stabilized the situation. As in Sicily, naval bombardment decimated German armor formations, and combined with aerial attacks by the Royal Air Force and U.S. Army Air Force, forced the German army to break off the battle and retreat inland. The German general commanding the failed counterattack reported to his superiors, "The attack this morning (September 14) had to endure naval gunfire from at least 16 to 18 battleships, cruisers, and large destroyers. With astonishing precision and freedom of maneuver, these ships shot at every recognized target with overwhelming effect." Mobility, firepower, and armor once again enabled warships to project power against shore fortifications.

## Landings in Normandy

*Operation Overlord*, the D-Day assault on Hitler's Atlantic Wall in Normandy, France, was the fifth major amphibious operation in the European Theater of Operations. It was also the largest amphibious operation in military history. The naval forces alone were without parallel: 1,213 ships, including six battleships,

25 cruisers, 4,126 landing craft, and 1,600 supporting ships.

Under the overall command of the Royal Navy, naval forces had three major missions: transport the troops across the English Channel, protect assaulting forces from attack by German surface ships and submarines, and provide fire support at five separate landing beaches: Utah (U.S.), Omaha (U.S.), Gold (British), Juno (Canadian), and Sword (British).

As in Sicily and mainland Italy, naval gun fire support of the amphibious forces proved essential to victory. Lieutenant General Omar Bradley, a veteran of the Sicily landing, knew the value of gunfire support in an opposed landing. In his autobiography, Bradley wrote, "I would gladly have swapped a dozen B-17s for each 12-inch gun I could wrangle."

At Omaha Beach, a dozen destroyers moved to positions as close as 800 yards from the beach to pound enemy gun positions and machine gun and pillbox positions with naval gunfire. While some of the fire was controlled by shore fire control parties, heavy losses suffered by these personnel left much of the mission execution up to the initiative of the individual commanding officers. A detailed study of the battle at Omaha Beach concludes that "naval gunfire from destroyers proved to be the only reliable part of the Joint Fire Plan." This account includes the following eyewitness account from a soldier on the beach: "Two destroyers moved in incredibly close, so close we could almost yell to their crews, so close the Germans were hitting them with rifle bullets. They fired broadsides directly at us, it seemed, and while their shells were just above our heads, plus the thunderclaps of their 5-inch guns, it was almost as terrifying as the German artillery. Their gunfire was amazingly accurate."



*Destroyers and landing craft at Omaha Beach on D-Day, 6 June 1944. The destroyers closed near the shore to fire at enemy positions.*

## Kamikazes to A-Bombs

Even while suffering nearly continuous defeats since 1942, the Japanese still had one weapon yet to deploy: kamikaze suicide-attack planes. The idea of suicide-attack planes was seen as the answer to Japan having lost most of her experienced pilots by mid-1944. With Japanese air assets now both outnumbered and outclassed by their American adversaries, the odds of victory in conventional air-to-air combat or attack on enemy ships were small. Since kamikazes were



intended to be little more than missiles equipped with human guidance systems, required to simply crash into a warship, little training or combat experience was required. Thus, suicide attacks were very difficult to counter, as the kamikaze had to be completely destroyed in the air, not just damaged.

An innovation that proved essential to countering this threat was the establishment of Combat Information Centers (CIC) in most U.S. warships to integrate radar and other sources of information, which in turn could be provided to all weapons stations and used to direct combat aircraft. Although primitive compared to today, these World War II CICs represented a tremendous advance in naval tactical operations. In conjunction, more fighters were added to carrier air groups to augment fleet air defense. Other tactics included increasing the horizontal cruising formation of fast carrier task groups out to 60 nautical miles, with the outer perimeter manned by radar picket destroyers.

By early 1945 the island-hopping campaigns that had characterized the last two years of operations in the Pacific were at an end. The Navy recognized that the Pacific War had shifted towards open-ocean operations off the east coast of Japan and the periphery of the Asian continent. The new objective was the destruction or neutralization of enemy land-based air power. What Allied land-based air power had done to Nazi war fighting capability in France was what the Navy's fast carrier task groups intended for the Japanese Empire.

The islands of Iwo Jima and Okinawa had to be captured to provide air bases for U.S. Army Air Force bombers to assault the Japanese. Seizure of these islands would require extended operations off the beachheads of both islands. Virtually immobile, U.S. ships would be subject to relentless kamikaze attacks. This called for new tactical requirements for all carrier task forces: more fighters, continuous combat air patrol, more radar picket destroyers, night carriers, and greater at-sea replenishment capability to support the large number of ships and aircraft involved in defending the carriers.

With fighting still raging on Okinawa, senior Army and Navy leadership planned for the final invasion of Japan. Although naval leaders were opposed to physically invading Japan, favoring a prolonged campaign of blockade and sea-based offensive strikes of air and shore bombardment, combined with Army Air Force B-29 bombings of Japanese cities to bring the war to an end, others believed that such tactics would never drive Japanese leadership, civilian or military, to capitulation. The result was development of a plan for the invasion of Japan, called *Operation Olympic*. Four missions for the U.S. Navy were indicated in prioritized order: 1. blockade Japan, 2. attack enemy airfields, shipping, and industry, 3. fend off kamikazes, and 4. provide close air support for landing forces.

The naval force assembled to support the invasion of Japan was composed of 24 fast carriers, 16 escort carriers, six Royal Navy carriers, and a supporting force of battleships, cruisers, and destroyers numbering more than 400 vessels. Preparatory operations began in July 1945 as three battleships, two cruisers, and nine destroyers began shore bombardment of the island of Honshu. Carriers from Task Force 58

provided protection from kamikazes, but no attacks were launched. The Japanese had given up on attacking the fast carriers and other surface combatants. They had carefully hidden their remaining aircraft to await the invasion, which they believed would occur on the island of Kyushu in October 1945.

Shore bombardment and air strikes against merchant ships and the few remaining operational Japanese warships continued throughout the month. Air attacks were also directed against remaining Japanese aircraft carriers and battleships which remained in port unable to get underway.



Another view of USS *Bunker Hill* (CV-17) hit by a kamikaze at the Battle of Okinawa, 11 May 1945.

In early August Admiral Nimitz directed all 3<sup>rd</sup> Fleet ships to head south, away from southern Japan. The reason only became apparent when on August 6 an Army Air Force B-29 flying from the Marianas dropped an atomic bomb on the city of Hiroshima, on the island of Honshu. With the effects of radiation on the air and sea in the vicinity of Hiroshima unknown, Nimitz wanted American forces well clear of any dangers that might spread from the atomic strike. Three days later, on August 9, another atomic bomb was dropped on Nagasaki, on the island of Kyushu.

On August 14, Imperial Japan announced its unconditional surrender. With the formal surrender ceremony onboard battleship USS *Missouri* (BB-63) on September 2, 1945, World War II was over.

### Navy's Role in the Cold War

The number of ships that comprised the Navy on VJ Day staggers the imagination. Present in almost every region of the world were more than 100 aircraft carriers of various types, 5,000 ships and submarines, and 82,000 vessels and landing





craft. However, the war was over, the world was at peace, and within two years more than 2,000 warships and 2,000 service and amphibious craft were laid up or scrapped. More than one million personnel were transferred to the reserves or completely released from duty.

One war was over, but another one was emerging. In 1946 President Truman sent *USS Missouri* (BB-63) and the newly commissioned aircraft carrier *USS Franklin D. Roosevelt* (CV-42) to the Eastern Mediterranean to show American support for pro-Western governments in both Greece and Turkey, endangered by Communist insurgents and overt pressure from Stalinist Russia. In March 1947 the Truman Doctrine was declared, stating that the policy of the United States would be to “support free peoples who are resisting attempts by armed minorities or outside pressure.”

What would be the role of the Navy in this period that eventually led to the Cold War? The scope of our victory in World War II meant no nation was able to challenge American naval power. In the wake of total victory, the role played by strategic air power made it easy to believe that the key to future victory against any enemy would lie in the air, not the sea. The destruction of Hiroshima and Nagasaki by strategic air power allowed its advocates to argue that atomic weapons had made a large standing Army and a large Navy obsolete, legacies of the old “pre-air” age. By the late 1940s that is what many Americans, including President Truman, accepted as the future course for America’s armed services.

Cancellation of the planned 65,000-ton “supercarrier” *United States* in 1949 was a result. Many questioned the need for any Navy in the Atomic Age.

It was the North Korean invasion of the Republic of Korea (South Korea) that slowed (but did not stop) the drift towards a national security policy relying exclusively on atomic bombs.

### Historical Vignette: Korean War Operations.

*The 1950 North Korean invasion of the Republic of Korea came as a complete surprise to the United States. South Korean forces were overmatched and American ground forces, hastily assembled from peacekeeping troops in Japan and flown to the battlefield were pushed back. They would have been completely overrun and left the nearly defenseless Republic of Korea (South Korea) occupied had it not been for the delaying actions of Marine Corps air and ground units and air strikes launched from fleet carrier USS Valley Forge (CV-45). The F-9F Panther fighters were the first Navy jet aircraft to enter combat. However, World War II vintage aircraft were still relevant; Marine Corps propeller driven ground-attack aircraft, which had performed close air support missions in the Pacific War, made the North Korean army and its Soviet T-34 tanks pay a high price for their advance. In Washington, thinking about the future of naval aviation began to change. The ongoing conflict in Korea was proving the need for modern naval aircraft and the carriers to support them.*

*Aside from conventional strike missions launched from aircraft carriers, the*

*Navy quickly neutralized the small North Korean navy, composed of about 45 small vessels, mostly torpedo boats and gun boats. Within a week of the commencement of hostilities, President Truman ordered a close naval blockade of North Korea. Helicopters were employed for the first time in maritime surveillance, logistics, and pilot rescue operations.*

*An amphibious assault at Wonsan, on the east coast of Korea, was delayed six days due to 3,000 mines laid by the North Koreans with aid from Soviet advisors. The minefield was so extensive that warships tasked to lay down shore bombardment could not get close enough to their targets to be effective. The Navy had little minesweeping equipment in the area, and effectively lost sea control in the Wonsan area until sufficient vessels became available to sweep the harbor.*

*To prevent the war from expanding into a conflict in the South China Sea, the Navy also positioned units between Taiwan and China. Throughout the Korean War, the U.S. 7<sup>th</sup> Fleet would maintain continuous patrol of the Formosa Strait.*

*The Navy’s re-establishment and maintenance of sea control permitted amphibious operations at Inchon, Wonson, and Hungnam to proceed. From 645 amphibious ships on VJ Day, the Navy had only 81 still on active duty in the summer of 1950. They were sufficient, however, to conduct the strategic surprise operation at Inchon, save the U.S. Eighth Army at Wonson, and after China’s entry into the war on the side of North Korea in November 1950, evacuate more than 196,000 U.S. troops and Korean refugees from the port of Hungnam.*

*Inchon was the most important battle of the war and prevented a quick defeat of U.S. and U.N. forces. On the night of September 14, 1950, Marines from the 1<sup>st</sup> Marine Division traveling in high-speed destroyers supported by destroyer escorts and followed by large landing craft approached the port. Transferring to the landing craft, the Marines landed at first light on September 15 on the fortified island of Wolmi-Do, supported by fire from two U.S. heavy cruisers and one Royal Navy light cruiser. When the late afternoon tide permitted additional operations, a second wave of Marines landed to the north and south of the now-captured fortress of Wolmi-Do. North Korean forces proved unable to mount a successful counterattack and Marines employing ladders were soon climbing up and over the seawalls into the port city. General MacArthur would subsequently proclaim, “The Navy and Marines have never shone more brightly than this morning.”*

*Eventually almost 50,000 American soldiers and Marines would land at Inchon. The successful operation led to the re-capture of Seoul on September 28. As MacArthur had envisioned, the North Koreans were forced to retreat northward, abandoning the siege of Pusan, and fleeing north of the 38<sup>th</sup> Parallel, roughly the current boundary of the Republic of Korea.*

*Naval aviation was also critical in the Korean conflict. In the last stages of the war, when Chinese troops attempted a final assault on the South, U.S. naval forces flew more than 7,500 air missions to stem the invasion.*



A post-war official study of the sea war in Korea concluded that at Inchon there was “no more striking example of the effectiveness of an amphibious operation.” Inchon proved that conventional naval forces, amphibious operations, and the Fleet Marine Force were still relevant in the age of the atom bomb. From an opponent’s side, the commander-in-chief of the Soviet navy, Admiral Sergei Gorshkov, concluded, “Without wide, active use of the fleet, the interventionists could hardly have escaped military defeat in Korea.”

Atomic bombs did not prevent the Korean War. Nevertheless, the Truman Administration termed the war a “police action,” and U.S. war planning remained myopically focused on an all-out air atomic war on the European continent. In this period, it seemed difficult to publicly explain the Navy’s role in American defense. But the ideas and arguments of scholars and civilian experts who took a long-term, history-based view of what the Navy provided to the Nation proved to be extremely influential. In the May 1954 issue of the United States Naval Institute *Proceedings*, Harvard professor Samuel P. Huntington addressed the needs for a Navy in an article entitled “National Policy and the Transoceanic Navy.” He identified the fundamental element of a military service as its purpose or role in implementing national policy, its “strategic concept.” Huntington maintained that

the strategic concept the Navy had espoused since the dawn of the 20<sup>th</sup> century seemed no longer relevant to the American people. Huntington noted that while the Navy still proclaimed itself the nation’s “first line of defense,” in the public’s view “there was nothing for the Navy to defend the nation against.”

Huntington sketched a brief history of the nation’s land and sea power in terms of phases: a “Continental Phase” lasting until the 1890s, an “Oceanic Phase” that began with the Spanish-American War, in which the Navy “began to project its interests and power across the ocean,” and finally the current “Eurasian Phase” which now perceived threats to America as “originating in the heart of the Eurasian continent.” This phase obviously played to the strengths of the Army and Air Force as it centered on troops stationed on European bases and a strategy focused on the atomic bomb and the intercontinental bomber. However, Huntington suggested that the Navy’s role in the “Eurasian Phase” of national security policy was to evolve into a “Transoceanic Navy,” one strategically focused on projecting power into the land masses and littorals across the oceans in support of America’s role as the leader of the world’s democracies in the post-World War II era.

In the context of the intensifying Cold War and the Korean conflict, Huntington recommended that the Navy’s focus shift from gaining supremacy on the seas (which it had obtained in 1945) to a Fleet designed to project power ashore by means of carrier-based air and amphibious forces. Exploiting its command of the seas, it should develop an operating construct that used the sea as a base of operations right up to a potential enemy’s shores, giving the United States a strategic advantage and tactical flexibility in force employment not available to our Cold War adversaries.

In Huntington’s view, the Navy’s purpose now was “not to acquire command of the sea but rather to utilize its command of the sea to achieve supremacy on the land.” This would require a fundamental shift in naval priorities and perspective, “a real revolution in naval thought and operations. For decades the eyes of the Navy have been turned outward to the ocean and the blue water; now the Navy must reverse itself and look inland where its new objectives lie.”

To accomplish this new mission, Huntington identified three principal weapons forms that would be required: carrier-based air power “capable of striking a thousand miles inland with atomic weapons”; amphibious power that could not only land in the areas immediately adjacent to the sea but “with the development of carrier-based air lifts make it possible to land ground combat troops far inland”; and naval artillery which would evolve into guided missiles “able to bombard land objectives far removed from the coast.” This prescient vision was largely realized over the next five decades. Polaris submarines and big-deck carriers capable of launching aircraft with deep strike missions would be introduced to the Fleet in the 1950s. Tomahawk missiles in the 1990s would extend the range of “naval artillery” to hundreds of miles. Marines transported from aircraft carriers and big deck amphibious ships would land hundreds of miles from the nearest coastline in Central Asia in the 21<sup>st</sup> century.



Aerial photo of waves of U.S. landing craft moving towards Red Beach at Inchon, Korea. In the foreground, destroyer USS De Haven (DD-727) is in position to provide gunfire support. Smoke billows from air strikes ashore.





From the mid-1950s through the end of the century, the Navy's enduring strategic objective would be focused landward, employing the sea as a base of operations from which to project power ashore. The Cold War confrontation with the Soviet Union was not a struggle over control of the world's oceans between two maritime nations. Rather it was a struggle, from Moscow's viewpoint, of its fledgling navy's attempt to extend its defensive perimeter against the possibility of a multi-pronged attack by the U.S. Navy as the world's principal sea power. The Reagan Administration's Forward Maritime Strategy of the early 1980s, with its decidedly offensive concept of operations, exploited U.S. control of the seas and presented an exceedingly difficult problem to Soviet military planners. By the end of the decade, an economically exhausted Soviet Union quit a conflict that had consumed both sides for more than four decades. The Cold War was over.

## Historical vignette: Cuban Missile Crisis.

*In the summer of 1962 Soviet engineers began construction on the island of Cuba facilities for launching medium-range ballistic missiles capable of reaching significant portions of the eastern and southern United States. An Air Force U-2 reconnaissance flight on October 15 photographed the bases under construction. After a week of secret deliberations with the Executive Committee of the National Security Council, President John F. Kennedy announced the presence of the missile bases to the American public on October 22, 1963, and demanded their removal. The President ordered a massive deployment of U.S. troops to bases in the Gulf Coast region and placed the Strategic Air Command in an increased readiness status. He also announced to the world the imposition of a "naval quarantine" on the island of Cuba until the Soviet missiles were removed.*

*Kennedy and his advisers had considered a number of options, from surgical air strikes to an outright invasion by Marines and Army troops, to force the Soviet leadership under Nikita Khrushchev to withdraw the missiles. Intelligence had determined that at least 19 tankers and cargo ships were then enroute to Cuba with ballistic missiles and parts.*

*In the tense week between discovery and public announcement, the value of naval forces and the employment of a "naval quarantine" appealed to the President. Imposition of a quarantine would show American resolve while at the same time allowing Soviet leadership to avoid having to respond to an overt American attack possibly leading to a nuclear exchange.*

*The President decided to employ a naval quarantine against "offensive weapons" effective October 24, two days after the public announcement. By the time the blockade was imposed, three aircraft carriers, two cruisers and 22 destroyers had deployed from the eastern United States and taken station northeast of Cuba. Five amphibious squadrons including four helicopter assault carriers and 11,000 embarked Marines were also underway, and 11,000 additional Marines were standing by at Camp Pendleton in California.*

*On 24 October, six Soviet ships approaching the quarantine barrier suddenly*

*stopped, and subsequently reversed course. Various other vessels were stopped, boarded, and inspected for missiles and related materials. None were found to have offensive materials aboard and were permitted to continue to Cuba.*

*The imposition of a blockade achieved its intended purpose. As expected, Khrushchev objected to American interference in Soviet-Cuban relations and violation of the Soviet right to freedom of navigation. However, faced with an American naval response unanimously endorsed by the Central and South American nations of the Organization of American States, Moscow directed its missile-carrying vessels not to challenge the U.S. Navy's blockade.*

*Despite the downing of an Air Force U-2 reconnaissance plane over Cuba on 27 October, President Kennedy remained intent on resolving the crisis. When the most critical phase of the Cuban Missile Crisis was over, the President ordered the naval quarantine ended.*



*A U.S. Navy P-2V Neptune flies over Soviet freighter during Cuban missile crisis.*

## Nuclear Submarine Development

At the end of World War II, the United States had the largest and most capable submarine force in the world. But all diesel and electric battery-powered submarines still suffered from two critical war fighting shortfalls: limited underwater range and inadequate speed.

In 1946, Chief of Naval Operations Chester Nimitz authorized an examination of the feasibility of developing nuclear propulsion for a submarine. Convinced that a submarine nuclear power plant was workable, active engineering began in 1947, to be led by Admiral Hymen Rickover. In June 1952, President Truman laid the keel of the first nuclear-powered submarine, *USS Nautilus* (SSN-571), which was commissioned in September 1954. On January 17, 1955, *Nautilus* got underway from Groton, Connecticut. Proceeding down the Thames River to Long Island Sound, a signalman flashed "Underway on nuclear power" to an accompanying escort vessel. It was a historic moment in naval history.

*Nautilus* was a revolutionary submarine. She could remain submerged for an indefinite period of time and was faster both on the surface and underwater than any





diesel-electric submarine. Additional submarines followed, continually benefiting from new technologies and designs. These included the teardrop-shaped hull first seen on the *Skipjack Class*, single screw propellers, and higher strength steel to permit greater speeds, maneuverability, and operating depths. Attack boats built throughout the Cold War—including the *Thresher/Permit Class* (15), *Sturgeon Class* (38) and *Los Angeles Class* (68)—were viewed by naval leadership as the Navy's principal means of countering the Soviet navy's surface and undersea threat.

The Cold War also saw the introduction of the ballistic missile submarine, a platform capable of launching a nuclear weapon with an effective range of more than 2,500 miles.

In August 1955, Admiral Arleigh Burke became Chief of Naval Operations and revived the Navy's interest in taking ballistic missiles to sea. Burke established a Special Projects Office to oversee the effort, and in November 1955 a sea based program was approved by the Department of Defense. Advances in solid propellants and corresponding reductions in the size of thermonuclear warheads were critical for the Navy program. In December 1956, the Navy program shifted from surface ships to submarines and the *Polaris Submarine Launched Ballistic Missile* program was inaugurated.

*USS George Washington* (SSBN-598) was placed in commission in December 1959. At sea on June 20, 1960, it launched two unarmed *Polaris* missiles from approximately 60 feet below the surface. After completion of the second launch, Rear Admiral William Raborn, the director of the Special Projects Office, sent a message to President Eisenhower: "POLARIS—FROM OUT OF THE DEEP TO TARGET. PERFECT." By 1967, the Navy had 41 *Polaris* submarines at sea, known as "41 for Freedom." The strategic calculus of nuclear deterrence had been fundamentally changed, as the tactical advantage of "surprise" that so often figured into the superpowers' strategic planning in the 1950s was negated by a force at sea that was largely undetectable and invulnerable.

### Development of Naval Anti-Air Missiles

The aircraft carrier remained the centerpiece of naval operations in the 1950s. But the capabilities of Soviet-built jet aircraft in the Korean War posed a critical threat. Carrier defense consisted at this time of airborne and surface radar pickets, carrier-borne fighters, and armed surface escorts. Guns, which had been a mainstay of our carrier defense in the Pacific War, were now thought to be ineffective against high-altitude, high performance jet aircraft. While anti-air (air defense) guided missiles, along with nuclear power and jet aircraft, had been top Navy priorities in the years immediately following World War II, the Korean War gave added impetus to their procurement.

By the end of 1960, three surface-to-air missile systems had been installed in cruisers, destroyers, and frigates (then called destroyer escorts).

The first to become operational, *Terrier*, with a maximum range of 40 nautical miles, was installed aboard a re-designated heavy cruiser, *USS Boston* (CAG-1). In

1958 a larger guided missile, *Talos*, with an operational range of from 50 to 100 miles, was also taken to sea. An intermediate missile, *Tartar*, was also deployed.

Air defense capabilities took a tremendous leap in the 1970s with the development of the AEGIS Weapon System, which paired the phased-array SPY-1 radar with the Standard Missile 1 (SM-1) and follow-on Standard Missile 2 (SM-2), and SM-3 and SM-6 today. The phased array radar is a multi-generation improvement over rotating radars and allows for detection, tracking, and engagement of multiple air targets using a single radar.

*Sea Sparrow* (now ESSM) and *Rolling Airframe Missile* (RAM) were also developed as point-defense weapons for ships, along with the *Phalanx* Close-In Weapons System (CIWS), very-high speed gattling gun.

### Navy in the Vietnam War

The 11-year long conflict in Southeast Asia saw extensive naval operations in support of the war effort. The August 1964 Gulf of Tonkin incident, in which North Vietnamese torpedo boats attacked a Navy destroyer led to retaliatory air strikes against North Vietnam, and a U.S. commitment to the war.

*Operation Rolling Thunder*, conducted between March 1965 and November 1968, was the name given to the Air Force/Navy/Marine Corps air campaign in the skies over North Vietnam. The maritime component of the campaign was largely air strikes flown from multiple aircraft carriers in "Yankee Station," located 75-100 miles east of the Gulf of Tonkin. Navy and Marine Corps pilots faced credible air defenses largely supplied by the Soviet Union, including anti-aircraft gun systems and SA-2 *Guideline* missiles. Aviators who were shot down, captured, and tortured by the North Vietnamese were led in a resistance effort inside their prisons by then-Commander James Stockdale (later Vice Admiral).

*Operation Market Time*, conducted between March 1965 and December 1972, was the name given to coastal interdiction operations intended to interrupt the flow of supplies to Communist insurgents operating in South Vietnam. Hundreds of vessels, from the U.S. Navy, U.S. Coast Guard, and South Vietnamese Navy patrolled a 1,200 mile coast line divided into nine patrol sectors extending 45 miles to sea. Closest to the coast line, Navy patrol gunboats, Coast Guard cutters, and various armed local craft conducted stop-and-search operations. Further to sea, Navy minesweepers and destroyers intercepted "blue water" traffic. Farthest from the Vietnamese coast line, long range maritime patrol aircraft conducted extended surveillance operations. Of all the naval operations in the Vietnam War, *Operation Market Time* was the most successful. North Vietnamese sea-borne traffic to the South largely ceased to exist by the early 1970s, forcing greater use of inland supply routes, known as the Ho Chi Minh Trail.

Some of the most innovative naval operations during the Vietnam War were those conducted by what came to be known as the "Brown Water Navy." A fleet of small vessels, not part of the Navy's original order of battle, conducted extensive riverine operations in South Vietnam's Mekong River Delta, a closely



knit thatch of almost 3,000 miles of tangled waterways and canals alternating between jungle-like ground cover and extensive rice-growing areas that supplied the majority of food to the South Vietnamese people. North Vietnamese-supported insurgents, the Viet Cong, had made the Mekong Delta a highway for importation of combatants, arms, and war supplies. It was to eliminate that traffic that the Navy embarked on this type of combined-arms warfare, reminiscent of the river campaigns of the Civil War.

## The Maritime Strategy and Collapse of the Soviet Union

Traumatized by the controversial Vietnam experience, America let its military power erode in the 1970s. Critics contended that the nation was conducting “unilateral disarmament.” Real defense spending fell by 22 percent and the Navy dropped from over 1,000 ships in 1970 to only 479 battle force ships. By 1981, the 23 carriers of 1970 had shrunk to 12. This downward trend occurred at the same time the Soviet Union was funding a rapid expansion of its military might, including the Soviet Navy. What had been largely a coastal defense force at the time of the Cuban Missile Crisis was now trying to become an offensively minded “blue water” navy. Interviewed in July 1980, Chief of Naval Operations Admiral Thomas Hayward noted this change with concern: “They’re building our kind of navy. The difficulty is they’re building it faster.”

The Vietnam had been over for eight years when Ronald Reagan took the Oath of Office in January 1981. From his very first days as President, he began a major program to reorder national priorities and rebuild America’s naval strength. In speeches he asserted that freedom to use the seas was America’s lifeblood and maritime superiority was a necessity. He nominated John F. Lehman Jr. to become Secretary of the Navy. Combative, assertive, and comfortable in the “give-and-take” of the Washington political arena, for Lehman and the President, “maritime superiority” meant two numbers: 15 carrier battle groups and a 600-ship naval force.



*Talos missile shipboard installation in the 1960s.*

But to President Reagan “success” meant more than just hulls in the water and planes on flight decks. The President wanted to *win* the Cold War, and to do so he needed a Navy that would leave not doubt in the minds of Soviet leadership as to who would win an encounter at sea. To operationalize the new Navy under construction, and realize the President’s objective of winning the Cold War, a Mahanian approach to seapower was required.

The resultant “Forward Maritime Strategy” was quite different than the limited, defensive strategy that had been adopted following the Vietnam War. Lehman and Chief of Naval

Operations James Watkins publicly articulated a strategy that stressed close-in offensive operations from air, surface, and undersea units of the Fleet. In event of war, attacks were to be conducted against key bases and oceanic choke points of the Soviet Union, with carrier battle groups accompanied by submarines operating in close proximity to Soviet coastlines. The goal was to put the Soviet



*A-4 “Skyhawk” catapults off USS Bon Homme Richard (CVA-31) for a Vietnam strike mission, March 1967.*

Navy, indeed, all its Armed Forces, on the defensive.

“The Maritime Strategy,” as it came to be called, aroused considerable controversy in the United States and abroad. But the doctrine served as the foundation for the naval buildup of the 1980s. The Navy stated in unclassified articles and speeches exactly what it would do in wartime in a manner rarely articulated before.

Soviet political and military leaders got the message. Abandoning their intentions to conduct open-ocean attacks on NATO shipping in event of a war in Europe, their naval exercises began shifting to defensive operations designed to protect the Soviet homeland, lessening the threatening investments in force structure and capabilities directed against NATO on the Central European front.

Ronald Reagan left the White House in January 1989. Less than ten months later, the Berlin Wall, symbol of communist tyranny and a divided Germany, passed into history. Its collapse unleashed forces that ultimately liberated all the captive peoples of the Soviet Empire. Soviet allies and proxies, such as Libya, lost their support. The Cold War was over.



### Historical vignette: Interception of Achille Lauro Hijackers and Operations against Libya.

On October 7, 1985, off the coast of Egypt, the Italian cruise ship MS Achille Lauro was hijacked by four Palestinians from the Palestine Liberation Front. The hijackers' goal was to sail the vessel to Tartus, Syria, and hold its passengers hostage. On October 8, following refusal by the Syrian government to allow the ship to enter Tartus harbor, a retired Jewish American businessman, Leon Klinghoffer, confined to a wheelchair, was shot twice and thrown overboard.

Returning to Port Said, Egypt, the hijackers eventually agreed to surrender the ship provided they were given safe passage to Tunisia aboard an Egyptian commercial jet. Once the Egyptian jet was airborne, it was intercepted off Crete by seven F-14 Tomcat jet fighters from USS Saratoga (CV-60) at the direction of President Reagan. The American planes forced the Egyptian 737 to land at the NATO airbase at Sigonella, Sicily. The four hijackers were remanded to Italian custody and the airliner permitted to continue on to Tunisia.

The Achille Lauro incident was a prelude to further action against terrorists in 1986. Against a background of attacks against innocent civilians in the Rome and Vienna airports in 1985, the United States determined that Libya's leader, Muammar Gaddafi, was responsible for aiding and abetting the terrorists. Libya had previously announced that the Gulf of Sidra, a body of water extending 62 nautical miles north of its coast to be its territorial waters and proclaimed a "Line of Death" should any non-Libyan vessel cross it. The United States rejected that assertion, maintaining that waters beyond 12 nautical miles of the Libyan coast were international waters. To reinforce the American position, the Navy continued to conduct Freedom of Navigation transits and exercises in the Gulf, ensuring that international sea lanes of commerce remained open.

Naval operations in January and February 1986 proceeded without incident. But in March a three aircraft carrier battle force, USS America (CV-66), USS Coral Sea (CV-43), and USS Saratoga (CV-60) accompanied by 23 cruisers, destroyers and frigates began conducting exercises in international waters in the vicinity of the so-called "Line of Death."

After several days of maneuvers and exercises, on March 24, 1986, AEGIS cruiser Ticonderoga (CG-47), and destroyers Scott (DD-995) and Caron (DD-970), moved south of the "Line of Death," accompanied overhead by several F-14 Tomcats from America. The Libyans responded by firing two surface-to-air missiles at the aircraft, both of which missed. Two additional missiles were jammed by an EA-6B Prowler. Two hours later a pair of Libyan MiG-23s took off from Benina air base in Libya with orders to shoot down the American aircraft. After a "cat-and-mouse" game with the Navy fighters, the Libyan fighters returned to base.

At the same time several Libyan patrol boats maneuvered to close the American warships. Aircraft from all three carriers remained in overhead patrol stations; in the late evening two A-6 Intruders from America attacked a Libyan La Combattante patrol boat with a Harpoon missile, the first combat use of

that weapon. It was disabled and Intruders from Saratoga destroyed the vessel using Rockeye cluster bombs. That night an air strike of F-14 Tomcats, F/A-18 Hornets, A-7 Corsairs and EA-6B Prowlers closed the Libyan missile site near Surt at low altitude. HARM anti-radiation missiles were fired from the A-7s when the Libyan radars were activated. After evading several anti-aircraft missiles fired by the Libyans, the U.S. aircraft engaged Libyan missile patrol boats operating off the coast. A Nanuchka Class corvette was destroyed by Rockeyes from a Coral Sea-based A-6.

On the morning of March 25, 1986, an additional corvette was located and disabled by Rockeye munitions from another A-6 flying off Coral Sea. It was finished off by a Harpoon missile launched by an A-6 from Saratoga.

Combat operations were over, but only for a short period of time. On April 5, 1986, Libyan agents based out of East Germany blew up a Berlin, Germany, discotheque frequented by U.S. service personnel, killing three and injuring more than 200 patrons. In response President Reagan ordered an air strike to be conducted on the military facilities at Benghazi and Tripoli and terrorist training camps at Sidi Bilal. In the early morning hours of April 15, 1986, Operation El Dorado Canyon commenced, when two dozen aircraft from carriers Saratoga, America, and Coral Sea, along with 18 Air Force F-111s flying from Great Britain attacked multiple targets in Libya. Complete surprise was achieved and significant damage inflicted, with the loss of a single F-111 to a Libyan surface-to-air missile.

### Strikes From the Sea and Increasing Effects Ashore

Operations Desert Shield/Desert Storm, the first Gulf War, demonstrated how much war at and from the sea had changed since Vietnam. Joint operations, the Navy working with other American, allied, and coalition forces was now becoming the norm, rather than the exception. High-paced air operations in direct support of fast-moving armored formations on the ground bore only passing resemblance to Navy close air support operations in the Korean War. Precision guided strike weapons, electronic warfare, command and control, all-night and all-weather capabilities possessed by U.S. Air Force and Navy aircraft, ships, and submarines demonstrated that a true "revolution" in military affairs had taken place in the armed forces of the United States between the rice paddies of Vietnam and the desert sands of Kuwait.

Nowhere was this more evident than in the evolution of the submarine force. Anti-submarine warfare had been the fast attack boats' principal mission during the Cold War. With the disappearance of the Soviet submarine threat, their focus changed to intelligence, surveillance and reconnaissance (ISR) for land operations and strike against land targets.

The BGM-109 Tomahawk Land Attack Missile in several variants was developed in the 1970s and deployed to the Fleet in 1983. The submarine's natural stealth characteristics complemented the range and prompt strike capability of the Tomahawk weapon. Constrained weapons loadouts, where submarine torpedo





tubes had to be shared by torpedoes, *SUBROC* anti-submarine rockets, *Harpoon* surface-to-surface missiles, and *Tomahawks* were resolved when *Los Angeles*-class boats were fitted with 12 vertical launch tubes for *Tomahawk* missiles, increasing weapons capability by almost 50 percent. With the commissioning of *USS Providence* (SSN-719) in 1985, all future *Los Angeles*-class boats had 12 vertical-launch *Tomahawk* tubes installed. On January 19, 1991, *USS Louisville* (SSN-724) fired the first submarine-launched *Tomahawk* missile in combat operations while submerged in the Red Sea supporting *Operation Desert Storm*.

### Historical vignette: Operation Praying Mantis.

The Navy's continued presence in the Persian Gulf began in the aftermath of World War II. In August 1949, the Navy established the Middle East Force comprised most often by a pair of destroyers, shore-based aircraft, and an oiler. Visits by aircraft carriers and other surface combatants occurred on an infrequent basis.

From 1950 to 1980 the entire region was in considerable turmoil. Three Arab-Israeli conflicts in the 1950s, 1960s, and 1970s presented numerous challenges to U.S. military presence in the region. The Yom Kippur War of October 1973, in which the United States provided considerable logistics support to Israel, resulted in the Arab nations, led by Saudi Arabia, embargoing all oil shipments to the United States. In the Middle East region 28 ports in 11 countries were closed to American warships and the four destroyers based in the Persian Gulf struggled to find sufficient fuel to conduct even routine operations.

The oil embargo was eventually lifted with the end of the war, but its impact on American policy in the region was considerable. In August 1977, the Carter Administration established the Rapid Deployment Force, which would eventually evolve into the U.S. Central Command. The Navy's presence in the region substantially increased with surface action groups and carrier task groups frequently conducting operations in the Persian Gulf area. The Middle East Force itself grew from five ships in the late 1970s to 17 ships a decade later.

Distinct from the rest of the Middle East culturally and ethnically, Iran also experienced turmoil that eventually led to the fall of the Shah Pahlavi and establishment of a theocracy by Imam Khomeini in 1979.

After the Shah's fall, U.S. naval presence in the Middle East was significantly increased. By mid-January 1980 there were 25 ships, including three aircraft carriers operating in the Persian Gulf and North Arabian Sea.

In September 1980 war broke out between Iran and Iraq. By October, 60 warships from the United States, Great Britain, France, and Australia were in the region, determined to keep the Hormuz Strait open to the flow of oil from the embattled region. The war would continue intermittently

for years, and so did the Navy's commitment to ensuring the unrestricted flow of oil from the Persian Gulf and freedom of commerce and navigation in international waters.

The perils of operating in a war zone were demonstrated in May 1987 when *USS Stark* (FFG-31) was struck by two *Exocet* missiles mistakenly fired by an Iraqi *Mirage F-1* fighter. Thirty-seven sailors died and only heroic damage control efforts kept the ship afloat. The U.S. commitment to maintain freedom of navigation remained; throughout the remainder of 1987 and into 1988 the Navy actively patrolled the contested waters of the Gulf to prevent the sowing of mines by either belligerent state. The danger of operating in a war zone was again shown in April 1988 when *USS Samuel Roberts* (FFG-58), seeking to evade three Iranian mines, backed into a fourth submerged mine which blew a 21-foot hole in the ship. Ten sailors were injured and again, heroic damage control efforts saved the ship.

President Reagan, with evidence of Iran laying mines in international waters, directed the U.S. Central Command to take retaliatory measures designated *Operation Praying Mantis*. Several gas-oil separation platforms manned by Iranian forces and used as surveillance platforms to target and coordinate attacks on merchant ships, as well as an Iranian frigate which had conducted numerous attacks on merchant ships in international waters, were selected for retaliation.

Three Surface Action Groups and aircraft flying from *USS Enterprise* (CVN-65) comprised the offensive force. On the morning of April 18, 1988, destroyers *Merrill* (DD-976), *Lynde McCormick* (DDG-8), and amphibious ship *Trenton* (LPD-14) attacked a gas-oil separation platform. After silencing Iranian gunfire from the platform, Marines and Explosive Ordnance Disposal personnel fast-roped from helicopters and destroyed the platform with explosives.

At nearly the same time, guided missile cruiser *Wainwright* (CG-28) and frigates *Simpson* (FFG-56) and *Bagley* (FF-1069) attacked another gas-oil separation platform. On-board fires and explosions prevented American personnel from boarding and destroying this platform. An Iranian frigate fled the scene and positioned itself between two oil tankers in the Iranian port of Bandar Abbas. But Iranian *Boghammer* speedboats did respond to the American actions and attacked several merchant ships transiting the region. American aircraft were vectored to the hostiles by frigate *Jack Williams* (FFG-24). *Rockeye* MK 20 cluster bombs sank one *Boghammer* and damaged four others. An Iranian fast-attack craft also closed American forces and fired a *Harpoon* missile at *Wainwright*. The cruiser and *Simpson* responded by firing five *SM-1* missiles in surface-to-surface mode at the hostile, followed by a *Harpoon* fired by *Bagley*. All five *SM-1* missiles struck the hostile, and *Bagley's* missile passed over the burning wreckage



of the Iranian boat.

The battle continued over the next several hours. An Iranian F-4 over water was fired on and damaged by Wainwright. Two Iranian frigates sortied from Bandar Abbas to confront U.S. forces. After firing surface-to-air missiles at U.S. aircraft, they were engaged by A-6Es from Enterprise firing Harpoons and Skipper bombs, and destroyer Joseph Strauss (DDG-16) firing a single Harpoon. One Iranian frigate's magazines detonated and the frigate blew up. The second Iranian frigate, the one originally sought by the Navy, returned to sea and fired its guns against another A-6E flying from Enterprise. In response, a single laser-guided bomb was dropped on the frigate, exploding inside and rendering it helpless. Iranian tugs eventually took it in tow to Bandar Abbas, an operation permitted by the Navy. Operation Praying Mantis was over.



*Iranian frigate Shahand burns following Operation Praying Mantis, 18 April 1988.*

For the first time since World War II, the Navy had engaged in a surface action against a determined enemy possessing an array of combat capability. The Navy's victory over this force proved the quality of its personnel, training and combat systems. Particularly noteworthy was the performance of the SM-1 *Standard* and *Harpoon* missiles. More importantly, the quality of the training of both the sailors of the surface action groups and the carrier sailors and aviators remained evident, demonstrating in a convincing manner that America's commitment to freedom of navigation in international waters was steadfast.

### **Historical vignette: Operation Allied Force.**

The collapse of the Soviet Union in December 1991 resulted in the nations of Eastern Europe finally escaping from almost five decades of Russian domination. Nowhere was the challenge to development of democratic institutions more apparent than in the former Republic of Yugoslavia. Slovenia, Croatia, and Macedonia all declared their independence during the mid-1990s and left the Cold War era Federal Republic of Yugoslavia. However, the Republic's largest political entity, Serbia, refused to allow the province of Kosovo to declare its independence. Responding to repeated incidents of "ethnic cleansing" directed against Albanian Kosovars, the United Nations in September 1998 adopted a resolution

expressing grave concern over the rising conflict in the former Yugoslavia. At the same time, the North Atlantic Treaty Organization (NATO) authorized an increased level of readiness amongst its members' armed forces and began planning an air campaign in Kosovo. Various diplomatic efforts over the ensuing seven months failed, and on March 23, 1999, the Secretary General of NATO ordered air operations against Serbia.

From the commencement of Operation Allied Force, under the overall command of the Supreme Allied Commander Europe (SACEUR), the Navy was involved, with destroyers and submarines from the Enterprise Battle Group conducting Tomahawk missile strikes. The carrier itself was in the Persian Gulf. In early April the carrier, air wing, cruisers, destroyers, frigates and submarines of the Theodore Roosevelt Battle Group (CVBG) arrived in the east Mediterranean, along with the Kearsarge (LHD-3) amphibious readiness group (ARG) and the Inchon (LPH-12) mine countermeasures squadron (MCS).

Combat operations in the following three months required a wide range of naval capabilities: tactical air strikes on Serbian land installations and armed forces; 84 surface ship and submarine-launched Tomahawk strike missions against high priority targets; anti-submarine and surface patrols conducted by armed P-3 maritime patrol aircraft flying from NATO air bases in Italy; and humanitarian missions conducted by NATO support ships and members of the 26<sup>th</sup> Marine Expeditionary Unit embarked in the Kearsarge ARG.

In the earliest stages of hostilities, which saw consistently bad weather over Serbian airspace, Tomahawk missiles, the only all-weather system available, was the weapon of necessity. When the weather improved in mid-April, Navy tactical air played a larger role, and proved, along with Tomahawk, to be the only power projection weapons in NATO's arsenal capable of striking a target on the same day it was assigned. Tomahawks were successfully employed for the first time against mobile targets, including 10 Serbian MiG-29 and MiG-21 fighters spotted on runways by overhead surveillance systems. Tomahawk missiles destroyed nearly 50 percent of the Serbian Integrated Air Defense System, including the highest percentage of relocatable targets.

Many Tomahawk missions were executed by American submarines. Five separate boats participated in strike missions, in addition to anti-submarine and indication and warning missions. A Tomahawk-armed Royal Navy submarine also conducted several successful Tomahawk missions, with requisite command and control connectivity provided by a U.S. destroyer in the Adriatic Sea.

Daily surface surveillance missions by P-3 squadrons allowed aircraft flying from USS Theodore Roosevelt (CVN-71) to focus exclusively on the air war over land, participating in strike and "kill box" operations over



Montenegro, Serbia, and Kosovo. With Roosevelt remaining in the Ionian Sea rather than entering the more confined waters of the Adriatic, air routes to targets were shortened and more maneuvering room was afforded the big deck carrier.

The presence of the Mine Countermeasures Task Squadron centered on USS *Inchon* alleviated a major concern of operating in the littoral: mines. Carrying mine hunting/sweeping helicopters, explosive ordnance disposal boats, and a cadre of people specifically trained and equipped, the Squadron was prepared for any potential mine threat, had it appeared. *Inchon's* heavy lift helicopters also proved essential in supporting ongoing humanitarian relief efforts, providing critical support to the Marines as they constructed refugee camps in Albania.

Yugoslavian President Slobodan Milosevic signed a Military Technical Agreement in early June, ending the ethnic cleansing and the air war over his country. The *Kearsarge* ARG quickly sailed around the Greece's Peloponnesian Peninsula and landed the 26<sup>th</sup> MEU in Thessaloniki, Greece, where it went into Kosovo as part of the initial NATO peacekeeping force.

### Naval Intervention, Humanitarian Assistance, and Stability...From the Sea

Despite the collapse of the Soviet Union, the challenges and dangers of a world system experiencing multiple imbalances placed new demands on the United States in the 1990s. The struggle to match diverse commitments with limited resources seemed to call into question established beliefs and traditional approaches towards national security.

The post-Cold War period also saw changing realities in terms of nationhood and sovereignty. Geographic borders no longer appeared to prevent the flow of ideas, commerce, people, and turmoil. State and non-state actors were frequently on the same playing field, and on almost equal footing. Global institutions and non-government organizations developed a following and political base separate and distinct from traditional nation-states, aided by mass communications networks and information exchanges that evolved during the early years of the Internet.

Frequent humanitarian assistance and peacekeeping missions in the two decades following the end of the Cold War demonstrated that numerous wartime and combat skills were transferable to humanitarian assistance. Wartime requirements of intelligence, assessment, transport, logistics, aviation, and several engineering skills were used extensively in military operations other than war. Humanitarian assistance had always been provided by forward deployed U.S. naval forces, but now it was formally codified as a military mission.

### Historical vignette: Operation Sea Angel.

On April 29-30, 1991, Cyclone Marian, with 140 mile per hour winds and a 20 foot high tidal surge devastated the country of Bangladesh, killing upwards of 140,000 people and leaving more than five million homeless. Numerous islands were inundated with flood waters, croplands ruined, ships sunk, and water and sewage systems destroyed. A newly elected government, reeling from devastation it was powerless to meet, issued a desperate call for international assistance in the cyclone's aftermath.

Answering the desperate call for help, on May 10, 1991, President George H.W. Bush directed the United States military to provide humanitarian relief to the people of Bangladesh. Advance teams from the III Marine Expeditionary Force (MEF) began arriving in country within 48 hours of the President's order to assess the inflicted damage and determine what type and level of humanitarian assistance would be required for what would become known as Operation Sea Angel.

Principal elements in the initial American response were the 15-ship Amphibious Task Force (ATF) composed of Amphibious Group 3 and the 5<sup>th</sup> Marine Expeditionary Brigade. These units had just completed a five-month forward deployment to the Persian Gulf as part of Operation Desert Storm and were homeward bound when new orders arrived. The ATF was diverted to the Bay of Bengal, and arrived 72 hours after the initial American survey teams.

It quickly became apparent that destruction of the distribution system of supplies and aid, some of which had been previously stockpiled by the government and international non-government organizations (NGOs) in anticipation of such a natural calamity, was the principal challenge.

The ATF had the means to provide the necessary aid. In addition to 3,000 Sailors and 4,600 Marines, there were 28 helicopters based on several Navy ships. Complementing the Navy-Marine Corps effort were five Army helicopters based in Hawaii and significant contingents of Army and Air Force Special Forces, engineers, aviators, and logistics planners.

To distribute vital supplies to the Bangladeshi people, fixed wing aircraft, initially Air Force Special Operations Command MC-130s, to be eventually replaced by cargo C-130s, were used to fly previously warehoused supplies from the relatively untouched city of Dhaka to the badly damaged port of Chittagong. Navy and Marine helicopters, Marine Landing Craft Air Cushioned (LCAC) vehicles and reinforced inflatable hull boats (RHIBs) then delivered supplies to isolated regions and desperate islanders living in the devastated delta created by the Ganges, Brahmaputra and Magma Rivers.

Several elements of Operation Sea Angel were unique in terms of humanitarian assistance missions. It was almost an entirely sea-based effort. Less than 500 of the nearly 9,000 United States armed forces personnel involved were housed ashore. Everyone else lived aboard the ships of the Amphibious Task Force. No U.S. personnel, except those involved with transporting cryptographic materials, carried any weapons. It was also the first time that an existing Marine Air-Ground





*Task Force (MAGTF) organization served as the basis for the Contingency Joint Task Force that was built up around it. The MAGTF supported combined humanitarian relief assets from Japan, Pakistan, Great Britain, a Cooperative American Relief Everywhere (CARE) group, and an Islamic Red Crescent group, all working within the overall task force organization. Humanitarian units from China and India, while not officially part of the task force organization, closely coordinated their relief efforts with those of the larger U.S. administered organization.*

*After its successful conclusion, the government of Bangladesh stated that Operation Sea Angel had saved as many as 200,000 lives in the ravished county. Viewed as one of the most successful humanitarian efforts in recent history, it established wide-ranging precedents and a blueprint for future humanitarian assistance missions. Certain aspects, particularly the direct involvement of U.S. military planners and leaders in planning and coordinating interagency efforts directed towards humanitarian assistance, would become hallmarks of the American military's "soft power" in the last decade of the 20<sup>th</sup> and first decade of the 21<sup>st</sup> century. As the Marine general in charge of the operation stated at its beginning, "We went to Kuwait in the name of liberty, and we've come to Bangladesh in the name of humanity." In 2005, the Navy applied the same principles to Operation Unified Assistance, humanitarian assistance in Indonesia following one of the most powerful tsunamis ever recorded.*



*Tomahawk missile launched from USS Phillipine Sea (CG-58) in Operation Allied Force, 31 March 1999.*

## Rise of New Global Challenges

As the 21<sup>st</sup> century dawned, direct military threat to the United States appeared to have dissipated. But the attack on 11 September 2001 made clear the shadowy threat of terrorist groups and insurgencies and instabilities in volatile regions of the world.

To deal with these continuing threats to global peace and security, the Navy remained deployed throughout the world much as it was between 1945 and 1989.

It was and remains singularly positioned to deal—as in previous history—with a full range of global challenges from Northeast to Southeast Asia, Central Asia to the Mediterranean littoral. The attributes and capabilities that provide decisive force for commanding the seas and projecting power over land is a requirement for assured and sustained access to overseas areas vital to U.S. interests, as well as homeland defense. This includes operations across the entire spectrum of conflict, and particularly against asymmetric threats. Certainly no mission or naval planner could plausibly have envisioned the nature of the campaign that the Navy and Marine Corps conducted in the shadow of Hindu Kush Mountains in late 2001.



*Tribute to victims and heroes of 9/11: USS New York (LPD-21) passes by the site of the World Trade Center, 8 September 2011. USS New York has 7.5 tons of steel recovered from Ground Zero within her structure.*

## Historical vignette: Intervention in Afghanistan.

The invasion of land-locked Afghanistan in 2001, Operation Enduring Freedom, was unique in the annals of naval warfare. Sea-based power projection forces, principally tactical aircraft based on aircraft carriers operating in the Persian Gulf and North Arabian Sea, provided U.S. Special Forces and their Afghani allies with the majority of air support until augmented by Air Force bombers forward based in Diego Garcia.

In the aftermath of 9/11 President George W. Bush declared war on terrorists and authorized immediate retaliatory strikes on Al Qaida and Taliban bases in Afghanistan. Aircraft carriers USS Enterprise (CVN-65) and USS Carl Vinson (CVN-70) began conducting strike operations on 7 October 2001. In addition, Tomahawk missile strikes from cruisers and destroyers destroyed critical command and control centers for the Soviet-supplied air defense system. Forty-eight hours after the first planes left the flight decks of Enterprise and Vinson, the Afghani air defense missile sites had been destroyed and daylight bombing operations could commence.

On October 12, USS Kitty Hawk (CV-63) arrived on station. In addition to conducting air strikes, the carrier also served as the afloat staging base for the 160<sup>th</sup> Special Operations Aviation Regiment charged with conveying Special Operations Forces deep inside Afghani airspace.

When American, British, and Coalition forces entered Afghanistan in force, Marines were flown by helicopter more than 400 miles from amphibious assault



ships USS Peleliu (LHA-5) and USS Boxer (LHD-4) to their designated combat landing areas.

*Not only was this operation conducted against a totally land-locked country, but the extent of the distances covered by Marine Forces deployed from ships greatly exceeded previous efforts. Naval warfare had expanded.*

### Assuring Access

Reflecting on more than two centuries of naval history, it is apparent that “today’s fight” will not necessarily be tomorrow’s, in terms of location, adversary, or required combat capability. Winning any future fight—regardless of enemy, location or type of war—will require an agile, highly mobile force able to conduct such missions as assuring access, forcible entry, sustained operations, missile defense, large-volume long-range and precision fires.

One of the assumptions of America’s late 20<sup>th</sup>/early 21<sup>st</sup> century strategy was that the nation’s armed forces would have immediate and sustained access to regions of the world where American security and other interests lay. Given the post Cold War drawdown of U.S. military forces based overseas, projection of combat power came to depend more on expeditionary forces deployed forward on a rotational or temporary basis.

After *Desert Storm*, America’s armed forces began making force structure and organizational changes reflecting these early 21<sup>st</sup> century realities. Emphasizing mobility, they became increasingly capable of moving quickly to the fight. For this transformation to result in battlefield victory, access had to be gained and maintained.

The issue of “assured access” became one of paramount importance to the Navy. At the same time, other nations perceived that by providing an “anti-access” challenge to that “assured access,” they could expand their own regional influence. Nations began valuing their military forces for their perceived ability to keep the United States from projecting combat power into their respective regions of the world.

Anti-access and area-denial capabilities have become the object of most of the world’s militaries not aligned with the United States. Potential adversaries, like North Korea and Iran, increased their pursuit of land-based cruise and ballistic missiles, mines, advanced conventionally powered submarines, and sophisticated space-based satellite targeting capabilities. This is a continuation of the hostilities of the past, but with technologies of the present. Ballistic missiles pose an even more significant challenge to the 21<sup>st</sup> century United States and Allies and partner nations, requiring the Navy to adopt new missiles, such as ballistic missile defense. At the same time, cooperation with allies and partner nations have proven critical in dealing with such emerging threats.

### Partnerships with Other Navies

The Navy’s 2007 maritime strategy, “A Cooperative Strategy for 21<sup>st</sup> Century Seapower,” was a significant milestone for the U.S. Sea Services—the Navy, Marine Corps, and Coast Guard. The new strategy explained the role of the sea services in an era marked by globalization and uncertainty, and replaced the “The Maritime Strategy” promulgated in 1986 during the last years of the Cold War.

Presenting the case for the value of seapower and the reality of a global system of connected economies dependent on the free movement of commerce across the maritime commons, it emphasized the value of forward positioning of maritime forces, postured to prevent, deter, limit, and localize conflicts and wars. Noteworthy was the emphasis on global partnerships, with the Navy working closely with other nations’ sea services to reduce disruptions to the global system of connected economies.

The Cooperative Strategy identified six core capabilities required to achieve a balance between peacetime engagement and major combat operations. Four of these were capabilities emphasized by the Navy during the Cold War: forward presence, deterrence, sea control, and power projection. The remaining two capabilities reflected a political environment that required a change in priorities in the two decades after the fall of the Berlin Wall: maritime security and humanitarian assistance/disaster response. Noting the prominence given to Navy humanitarian efforts in recent global disasters, former Chief of Naval Operations Admiral Gary Roughead noted that such operations were based on “peace-time relationships to help mitigate human suffering by working together with other agencies and other nations responding to crises...U.S. seapower will always exist primarily to fight and help win our nation’s wars but...we can do more.”

In discussing “A Cooperative Security Strategy for the 21<sup>st</sup> Century” after its publication, Navy leadership emphasized the importance of global partnerships, with both maritime forces of other nations and international relief organizations. The existence of prior relationships before a security crisis or natural or man-made disaster occurs was also stressed. The size of the Navy’s force structure in the 21<sup>st</sup> century argued for increasing the training, organizing, and equipping of global partnership maritime forces to enable their full participation in both security and relief operations across the entire global commons.

Global maritime partnerships took on many forms after promulgation of the Cooperative Security Strategy. The establishment of the Africa Partnership Station in late 2007 saw Navy personnel conducting training exercises with their African partners in various elements of maritime security: boarding, search and seizure, and search and rescue. The following year, the Navy assisted in executing *Project Hope* which saw the delivery of \$500 million of medical supplies and equipment to nations throughout West Africa. A significant amount of piracy off the Horn of Africa and Gulf of Aden arose in 2010 with more than 200 attacks on merchant shipping and civilian vessels and 45 successful hijackings. The Navy responded by stationing ships in the affected areas and welcomed a broad coalition of nations,



including Russia and China, interested in curbing the historical plague of piracy and keeping the sea lanes free and open for global commerce. Areas of international patrol were eventually extended to the Maldives, Mozambique Channel, and the Sunda, Lombok and Malacca Straits.

### Enduring Requirements for American Naval Power

For more than 200 years the United States Navy has served the nation, growing from a small force *protecting American commerce* to a large and powerful Fleet that for most of the Republic's existence has been understood by the American people as the nation's *first line of defense*. Over the course of more than two centuries, the Navy developed a strategic tradition of *forward offensive operations*. During the Barbary Wars, War of 1812, Mexican War, Spanish-American War, World War II, Korea, Vietnam, *Desert Storm*, *Allied Force* and 21<sup>st</sup> century conflicts in Southwest Asia, these three operational roles, protecting American commerce, defending the homeland as first line of defenses, and forward offensive operations, became the "American way of war" at, and from, the sea.

The Maritime Strategy of the 1980s, intended to help bring the Cold War to an end, reflected not only the realities of the final years of a four decade long conflict, but the Navy's strategic inheritance. During the Cold War the Navy played a critical part in support of United States national interests in all three operational roles.

The victory of the Western powers in the Cold War was in great part a victory of maritime states over land powers.

The Cold War did not mean "the end of history" as some suggested, nor the end of the principal reasons for the Navy's existence. Sea control, power projection,

and continental defense remain, as they have since the founding of the Republic, enduring missions for our nation in this century.

The majority of 21<sup>st</sup> century time-critical contingencies and military operations will continue to require extensive employment of the Navy. This is a fact of global geography. Whether America's response in time of crisis is based on unilateral, allied, or coalition actions, sea-based forces will be an essential component of what form that response takes. While the classic view of powerful fleets at sea may seem out of place in a world far removed from the age of canvas sail and wooden decks, or of rival maritime powers, the fundamental concepts of sea power espoused by Alfred Thayer Mahan more than a century ago remain valid in the 21<sup>st</sup> century today.



*Africa Partnership Station (APS): Training of Tanzanian Navy sailors in visit, board, search and seizure (VBSS) conducted on USS Nicholas (FFG-47), 20 January 2010.*





## Current and Future Operations

The previous three chapters explained and illustrated the maritime environment and how those unique characteristics create a specific set of Navy attributes.

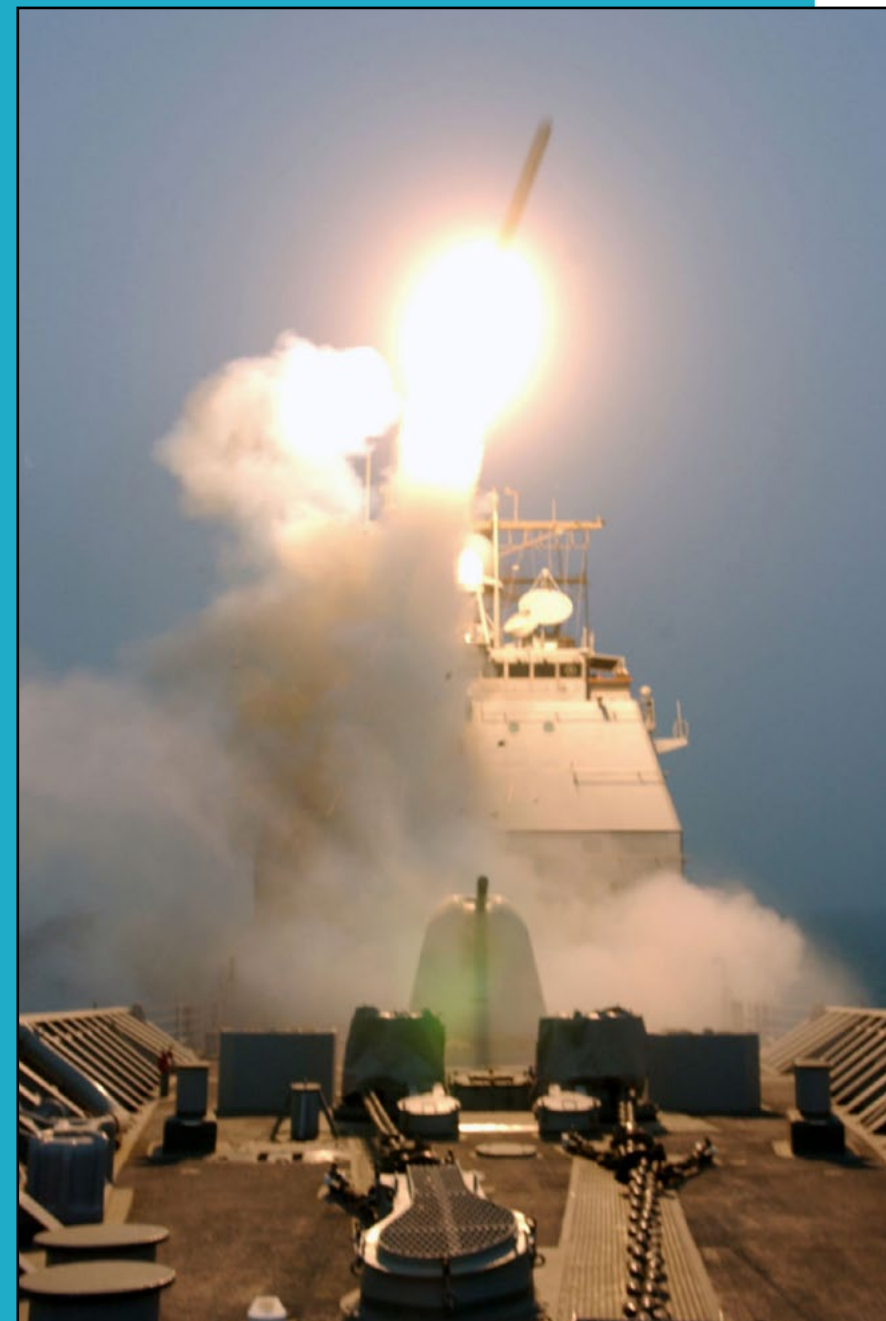
Our Navy's history demonstrates how those attributes have played out over time and further influenced and shaped our Navy culture and organization. Despite advancements in technology that have changed our combat capabilities, strategic missions, operational concepts and fighting tactics (we no longer rely on sails and wind to traverse the seas), those identified characteristics remain relevant and continue to influence how we operate today. The purpose of this chapter is to introduce the missions and concepts of current and future operations. As in the discussion of the maritime environment, the chapter is not intended to provide an in-depth explanation of all naval missions and warfare areas. The specifics of each are covered in the Navy Doctrine Publication and Navy Warfare Publication series, Navy Tactics, Techniques and Procedures from the Navy Warfare Library, tactical memoranda (TACMEMOs), and other unclassified and classified naval publications.

It is imperative that you are intimately familiar with the knowledge contained in tactical publications necessary to your billet, rating, watch-station, and other duties. This chapter is but an introduction to the operations of our Navy.

## Naval, Joint, Combined, and Coalition Warfare

A discussion of Navy operations must begin by identifying the fact that the Navy itself never fights alone as an individual Service. Since the establishment of the Department of the Navy, the U.S. Navy and the U.S. Marine Corps have operated together as our nation's Naval Services. Like the Navy, the U.S. Marine Corps is a maritime force—its traditional purpose being to operate with the Fleet to seize and defend forward naval bases in support of a naval campaign. Since its establishment—and due to the high degree of readiness it has always maintained—the Marine Corps has been called upon to conduct combat operations in a variety of locations—some far inland. But even these operations are conducted in conjunction with Navy units, particularly Naval Construction Battalions (Seabees), Explosive Ordnance Disposal Units (EOD), Navy Medical Units, Navy Chaplains, other support units, and backed by the overall combat capabilities of the entire U.S. Navy, such as from aircraft carrier air wings. The U.S. naval amphibious force is the most obvious example of the interconnectedness of the two Naval Services. Marines may not necessarily play a direct role in war fighting *at sea*, but all war fighting *from the sea* is predicated on the command of the sea achieved by the combat power of the Fleet.

The Naval Services also work closely in the maritime environment with the U.S. Coast Guard in defending the U.S. homeland and assisting in the enforcement of law at sea. The Coast Guard periodically deploys its cutters with naval strike groups. As a law enforcement agency as well as an armed service, it can routinely operate with non-military foreign agencies.



# Current and Future Operations



At the same time, all the armed forces of the United States are inherently *joint*, that is all Services—U.S. Navy, U.S. Marine Corps, U.S. Army and U.S. Air Force, along with the U.S. Coast Guard in times of war—are trained and equipped to fight together in the highest degree of interoperability achievable, under joint combatant commanders. *Jointness* is a principle built through the operational experience throughout U.S. military history, with specific Congressional legislation that facilitated it during recent decades. The U.S. Navy provides its particular capabilities and conducts its individual core missions as a part of joint war fighting, while also benefiting from the capabilities of the other Services in conducting warfare at and from the sea.

Combined operations is a traditional term for war fighting conducted together with the navies and armed forces of America's treaty allies, such as the members of the North Atlantic Treaty Organization (NATO), Australia-New Zealand-U.S. (ANZUS) treaty, bi-lateral treaties with Japan and the Republic of Korea (South Korea), and the Organization of American States. The U.S. Navy has continuously built and exercised interoperability with the navies and militaries of our treaty Allies since the Second World War and it was the solid nature of these alliances that resulted in the peaceful conclusion of the Cold War. Today, the U.S. Navy continues to conduct combat operations, humanitarian assistance, training, and cooperative defense programs with our Allies.

Additionally, the U.S. Navy conducts multilateral coalition and bilateral partnership operations with other partner-nations that are not necessarily treaty allies, but desire a high level of naval cooperation with the United States in order to achieve collective security. Most of these operations are the result of direct diplomatic relationships and are directed at achieving a specific mutual goal, but some are also conducted under United Nations. As we discussed, today's globalized economy—highly dependent on maritime trade—requires cooperative maritime



An F-14 "Tomcat" and an F/A-18 "Hornet" aircraft assigned to the aircraft carrier USS Enterprise (CVN-65) complete air-to-air refueling operations with a U.S. Air Force KC-10 "Extender" during Operation Enduring Freedom, 5 October 2001.

security in order to function and to provide increasing levels of prosperity.

Both combined/allied operations and naval cooperation with partner-nations and coalitions have been the determined focus of the U.S. Navy's Service strategy paper—also signed by the Commandant U.S. Marine Corps and Commandant, U.S. Coast Guard—entitled *Forward, Engaged, Ready: A Cooperative Strategy for 21<sup>st</sup> Century Seapower*, which emphasizes that "naval forces are stronger when we operate jointly and together with allies and partners." In addition to conducting exchanges and exercises, we apply considerable resources in building partner capacity through training and equipping foreign navies in order for them to work with us as a global network of navies to achieve global maritime security.



Australian, Japanese, and American service members pose for a photo aboard the Japan Maritime Self-Defense Force amphibious tank landing ship JS Kunisaki (LST 4003) upon arrival in Cambodia during Pacific Partnership 2014, 19 June 2014.

The point is that in our discussions of the specifics of how we fight, we must always bear in mind that how the U.S. Navy fights is a critical part of joint U.S. war fighting in which our role has direct and continuing effect on how the other Services fight. In joint operations, all forces are integrated and therefore dependent upon the capabilities of each Service components, even when the components are pursuing individual missions. Likewise, in conducting combined operations with long-standing allies, or multilateral or bilateral operations with other partner nations, the tactics, techniques and procedures that we use must facilitate the interoperability to sustain the combined effects of international naval power. To make such international operations successful, the U.S. Navy is often expected to provide considerable resources and leadership.

Moving beyond naval and military aspects of national strategy, we need also





to remind ourselves that how we operate is but a piece of how the overall U.S. government interacts with the world, creating national security and economic strategies. Naval operations are a significant part of the interagency cooperation necessary to achieve national goals.

## Strategic Imperatives

Our Navy is expected to employ its global reach, persistent forward-deployed presence, and operational flexibility to accomplish many tasks for U.S. national security, of which six can be considered key or *strategic imperatives*. How we fight—the employment of naval forces—is designed to achieve these strategic imperatives.

The practical objective of naval war fighting is to defeat an enemy of the United States—as we have done throughout our history. But the first way to achieve victory in war is to deter it from happening. U.S. joint combat capabilities, training, readiness, and deployments are designed to prevent potential enemies from conceiving that they could ever defeat the United States. Our role as the U.S. Navy is to ensure a level of dominance on the oceans so that those who oppose American interests would not choose to fight a war in the maritime environment.

Another aspect of the naval contribution to deterrence is our nuclear-powered strategic ballistic missile-carrying submarines (SSBNs) which are the most survivable component of America's triad of strategic nuclear deterrents.

If deterrence fails, our Navy will apply every capability it possesses to ensure victory as well as provide for the defense of our homeland—all of them integrated with the totality of American power. Our closest partner in providing defense-in-depth of the U.S. homeland from threats in the maritime environment is the U.S. Coast Guard. Coast Guard capabilities allow the Navy to focus on operating forward, at the far edges of this defense-in-depth.



*The Ohio-class ballistic-missile submarine USS Alaska (SSBN 732) returns to Naval Submarine Base Kings Bay following a patrol, 22 May 2014.*

The forward deployment of our Navy sends a powerful message that the U.S. is committed to preserving peace in the potentially-troubled regions of the world. If regional conflicts were to break out, the U.S. Navy would come to the defense of its allies and partner nations and, if it is possible to achieve a successful outcome, intervene to bring the conflict to a conclusion for the sake of a just peace and to prevent further human suffering. To do this, our Navy must maintain the ability to deploy forward with the appropriate level of credible combat power. The presence of our forward deployed Navy in potentially troubled regions in itself acts as a considerable deterrent.

As in the deterrence of other wars through the Navy's dominance in the maritime environment, fostering and sustaining cooperative relationships with an expanding set of international partners is also among the best methods of ensuring that regional conflicts do not begin. Building the capacities of our partner nations to provide for their own maritime security is a critical action in our efforts to maintain cooperative relationships. It also helps in preventing or mitigating international disruptions and crises since a particularly effective method is through the actions of international coalitions and multilateral agreements. In situations where humanitarian assistance is required, our Navy's forward deployments allow us to provide a timely response, often joined by efforts of other nations.

## Strategic Attributes, Enduring Missions, and Essential Functions

In Chapter 2, we discussed what we called the strategic attributes of the U.S. Navy--the attributes that are derived from the nature of the maritime environment and, in particular, our ability to operate within it. That does not mean, as we noted, that these attributes are achieved without effort and resources. Only nations that develop ocean-going navies capable of global operations can optimize these potential attributes. The U.S. Navy has been constructed, equipped, manned, and led so that it can. The attributes to which American Sailors have been inspired and

### Strategic Imperatives

- Deter major power war against the United States and her allies
- If deterrence fails, win our Nation's wars as part of a joint or combined campaign
- Contribute to homeland defense-in-depth
- Limit regional conflicts and demonstrate to our friends and allies our commitment to global security
- Foster and sustain cooperative relationships with an expanding set of international partners
- Prevent or mitigate international disruptions and crises





## Maritime Security

In a very real sense, overall maritime security is achieved by the application of the first four capabilities/strategic attributes. War fighting dominance in the global maritime environment ensures that the interest of the United States in ensuring international adherence to international law as concerns freedom of the seas and the global commons is effective. This includes maritime security tasks that, at first glance, seem more like law enforcement than war fighting. In doctrine, maritime security is considered “a collection of tasks... [and] operations (maritime security operations or MSO) conducted to assist in establishing the conditions for security and protection of sovereignty in the maritime domain. Examples of MSO include missions to counter maritime-related terrorism, weapons proliferation, transnational crime, piracy, environmental destruction, and illegal seaborne immigration.” These are not new missions; as is evident from our Navy’s history, we have routinely performed these missions since establishment. What is new is the complexity of these missions in a highly-integrated global economy in which disruptions to maritime trade have immediate effects on world prosperity. In the past, naval doctrine has not illuminated the maritime security mission simply because it was assumed to be but a part and by-product of the Navy’s other core missions. Today we must acknowledge that it is unique in itself, and constitutes much of the day-to-day activities involved in international maritime cooperation.

MSO is focused on enforcing U.S. and international law at sea through established legal and operational protocols, requiring integration with corresponding efforts of other U.S. government agencies, particular the U.S. Coast Guard/Department of Homeland Security, Department of State, and Department of Justice.



A visit, board, search and seizure (VBSS) team assigned to the guided-missile destroyer USS Mason (DDG 87) conducts operations in the Gulf of Aden, 21 November 2013.

trained lead to the operational attributes of the Fleet.

Although the attributes shape how we are capable of fighting on the strategic, operational and tactical levels of warfare, the physical components that allow us to operationalize these attributes are generally referred to in most Navy and Joint documents as capabilities. The written outline of the methods of applying the capabilities in naval planning is referred to as doctrine.

Joint force documents defined doctrine as “fundamental principles that guide the employment of US military forces in coordinated action toward a common objective.” Doctrine also includes tactics, techniques, and procedures. As noted in the definition, “it is authoritative but requires judgment in application.” Naval doctrine further refines joint doctrine as it can be applied in the maritime environment.

The Navy’s capabilities based on its attributes, which are in turn based on the advantages (and keeping in mind the limitations) of the maritime environment, informs current naval doctrine. This doctrine, guided by the *Forward, Engaged, Ready* strategy and articulated in Naval Doctrine Publication 1, *Naval Warfare*, details the operational character and employment of our U.S. naval forces—Navy, Marine Corps and Coast Guard. It highlights how our maritime forces can best achieve the strategic imperatives and the operational range of missions that we conduct. Along with other Service documents, NDP 1 identifies core capabilities that our Navy can and must provide to our Nation and the joint force in order to accomplish our national security objectives.

These core capabilities—again based on the attributes discussed--have also been referred to as enduring missions, Navy strategic concepts, and essential functions.

We have already discussed forward presence, deterrence, sea control, and power projection in some depth as attributes. We need to now examine the capabilities of maritime security and all domain access as additional essential functions, along with the mission of humanitarian assistance/disaster relief.

### Navy Essential Functions

- All Domain Access
- Deterrence
- Sea Control
- Power Projection
- Maritime Security



## All Domain Access

All domain access is a new term referring to “the ability to project military force in contested areas with sufficient freedom of action to operate effectively.”

It is a capacity to neutralize the anti-access strategies that might be used by potential opponents. As described in Forward, Engaged, Ready, when “employed in coordination with the Navy-Marine Corps team’s sea control and power projection capabilities, all domain access allows Joint Force Maritime Component Commanders to provide cross-domain capability to the Joint Force” through the elements of battlespace awareness, assured command and control, cyberspace operations, electromagnetic maneuver warfare, and integrated fires, which includes both kinetic and non-kinetic methods of attack. The ultimate goal is to allow the deployment of the Joint Force within the contested region so it can conduct the decisive operations necessary to deter or defeat a potential enemy. Assuring all domain access begins in peacetime through relationship building with allies and partners that results in interoperability, mutual security and trust.

## Humanitarian Assistance/Disaster Response

As a part of our essential function of power projection, humanitarian assistance/disaster response (HA/DR) is another traditional U.S. Navy core mission. Like maritime security, it has long been a natural part of other naval operations—enabled by our war fighting posture of persistent forward presence. NDP-1 notes that “the capabilities that allow naval forces to project combat power are also effective at responding to the world’s natural disasters.” As previously discussed,



*Helicopter Anti-Submarine Squadron Two (HS-2) drops food and milk to waiting refugees in Sumatra, Indonesia displaced by the 26 December 2005 Tsunami. HS-2 was embarked aboard USS Abraham Lincoln (CVN-72).*

these responses have always been a part of our history. With significant regional effects, but limited international visibility in the past, it was an expected but largely unheralded capability. But in today’s global economic and political environments characterized by widely-accessible and near instantaneous information, HA/DR missions not only have great international visibility, they are another critical component of maintaining global stability.

HA/DR missions require a considerable amount of international cooperation, another reason that our strategic imperatives include fostering and sustaining cooperative relationships with an expanding set of international partners. Our Navy can play a principal role in ensuring that humanitarian assistance is delivered to the intended recipients by providing the necessary logistics, particularly since much of the world’s population is now concentrating near seas, oceans and major waterways in littoral regions. Such logistics support includes air and sealift, robust long-range communications, and mission planning capabilities. Operation *Sea Angel* in 1991 and Operation *Unified Assistance* in 2004, both discussed in Chapter 3 are outstanding examples. Additionally, we can provide the services of our medical personnel, and almost all naval units have flexibility to take on non-traditional tasks when needed.

## Types of War Fighting Operations

Thus far we have concentrated on missions and essential functions. On a day-to-day basis, Navy war fighters focus on specific types of tactical operations that together enable the completion of assigned missions. Most Navy war fighters specialize in a particular type of warfare since expertise for combat requires long hours of dedication: study, training, exercising, and other practical experience. As one advances to positions of greater responsibility and leadership, expertise must be broadened to include an ever-increasing knowledge of multiple warfare areas. The commanding officer of a warship, for example, must have knowledge of every warfare area in which his or her ship participates or might encounter.

The basic types of warfare or warfare areas include: air warfare and air and missile defense, electromagnetic maneuver warfare, expeditionary warfare, information warfare, strike warfare, surface warfare, and undersea warfare. All of these areas

### Basic Types of Naval Warfare

- Air warfare and air and missile defense
- Electromagnetic maneuver warfare
- Expeditionary warfare
- Information warfare
- Strike warfare
- Surface warfare
- Undersea warfare





have subsets. For example, information warfare includes cyber warfare and space warfare (many reconnaissance, surveillance and communications assets are space-based). Undersea warfare includes anti-submarine warfare (ASW) and mine warfare (MIW). What follows are very brief discussions that only penetrate the surface layer of these warfare areas.

### Air Warfare and Missile Defense

Air warfare comprises the contest for air superiority within the maritime environment, both to defend our Fleet and allied and partner navies and to retain the capability of striking an enemy fleet or targets ashore. Air warfare, also traditionally known as anti-air warfare and now air defense (AD), is primarily focused on neutralizing an enemy's tactical and long-range strike aircraft (fighters and bombers), intelligence, surveillance, reconnaissance and command and control aircraft, and, as opponents develop such capabilities, unmanned aerial vehicles.

In conjunction with this, missile defense focuses on defeating incoming missiles, both cruise missiles and ballistic missiles. Such threats can be launched from either sea or land platforms.

In the maritime environment, U.S. Navy air warfare and missile defense (AMD) is combined-arms warfare involving sensors and weapons embarked primarily on naval aviation and surface warfare platforms. Along with these, Fleet and shore-based electronic and information warfare systems are integral parts of air warfare and missile defense, which also rely on robust command and control networks. This is true of all forms of naval warfare—each specialized warfare area function together seamlessly throughout operations, with command and control as a cross-cutting function.



*An E/A-18G Growler from Electronic Attack Squadron (VAQ) 132 conducts flight operations with aircraft from USS George Washington' (CVN-73) in waters south of Okinawa, Japan, 8 June 2014. AMD is linked with other warfare areas, such as Electromagnetic Warfare.*

A primary principle of air warfare and missile defense is defense-in-depth, that is, multiple layers of sensors and weapons systems which together reduce the possibility of a successful enemy attack. Different aircraft, missiles and other weapons are optimized for different ranges and effects, from over-the-horizon and even space to point defense. No one system is guaranteed to be effective against any one particular target. But together they can cover a wide range of areas, threat profiles and situations to increase the potential of kill (pK) against enemy targets. A defense-in-depth allows for multiple shots against a high-speed incoming threat. Along the far range of the effort is ballistic missile defense (BMD) of land by Navy surface warships.

### Electromagnetic Maneuver Warfare

Knowledge of the properties of the electromagnetic spectrum has already been identified as critical for operations in the maritime environment. Control over the maritime and littoral electromagnetic spectrum is essential for effective war fighting. Control includes both defensive and offensive measures—such as electronic warfare detection and neutralization systems, electromagnetic deception, and direct kinetic attacks on enemy electromagnetic capabilities. Electromagnetic maneuver warfare (EMW) is part of the overall battle, supporting and being supported by the weapons and sensors of the other warfare areas. It is intertwined with Information Warfare (IW) since much of operational information is transmitted through the electromagnetic spectrum. EMW systems are embarked on almost every naval platform, optimized for the mission, environment and enemy that the platform is expected to encounter.



*A Cryptologic Technician (Technical) monitors the electromagnetic spectrum of air and surface contacts in the combat information center aboard the guided-missile destroyer USS Ramage (DDG 61) operating in the Mediterranean Sea, 16 February 2014.*





## Information Warfare

Information warfare (IW) is popularly viewed as the newest form of warfare through its sub-set of cyber-warfare—a symbol of conflict in the modern information age. It is warfare area with the newest corps of naval warfare specialist, Information Dominance. But it is also involves historic activities such as intelligence and cryptology.

It has been said that information itself is a weapon, but in naval warfare it is the thread that runs through all warfare areas since it is the basis for all command and control. Information warfare is comprised of at least three interdependent functions: the acquisition and dissemination of information, the protection of our own information, and the denial of information to the enemy. It is not just about computers; it is about how information is utilized for command and control (C2) in all warfare areas.

A principle of information warfare is to provide operational decision-makers with knowledge, not just data. The modern world is awash with information, much of which is inaccurate and all of which must be pieced together to form an accurate picture of reality. The task of all personnel involved in information warfare is to not just collect information, but to analyze it and be able to determine what is of value to the various levels of command and control. Knowledge is information that is directly useful to naval war fighting. Information warfare is about transforming information into knowledge for use, and preventing the enemy from obtaining knowledge.



Sailors who just received the Enlisted Information Dominance Warfare Specialist pin at Camp Lemonnier, Djibouti, 16 August 2013.

A key principle of electromagnetic maneuver warfare is deception: the ability to operate against an electromagnetic warfare-capable enemy while remaining undetected, or by providing false signals and information that masks one's location and capabilities. Deception has been an element of strategy since the beginning of organized warfare; EMW has applied that principle into a relatively new medium of naval war fighting. EMW “blends fleet operations in space, cyberspace, and the electromagnetic spectrum with advanced non-kinetic capabilities.”

## Expeditionary Warfare

Expeditionary warfare includes naval operations to land and sustain forces ashore. A dominant aspect is amphibious operations conducted from Navy amphibious warships. Expeditionary warfare entails amphibious warfare, the hallmark of integration of the Navy-Marine Corps team. But it includes other types of operations ashore, including coastal and riverine warfare, explosive ordnance disposal, and naval special warfare. Specialized Navy units, such as Beachmasters are critical to successful landing operations. As with other warfare areas, expeditionary warfare involves combined arms, with operations conducted by all elements of the Fleet, air, surface, undersea. Embedded into the Marine Corps expeditionary force are numerous Navy personnel, such as medical personnel, construction battalions, and chaplains.

A principle of expeditionary warfare is maneuver—the ability to avoid the enemy's strongest position or capabilities by outflanking them and attacking where unexpected. This is a guiding premise of modern amphibious warfare and, indeed, all naval warfare.



A landing craft air cushion (LCAC) assigned to Amphibious Craft Unit (ACU) 5 approaches the well deck of the amphibious assault ship USS Peleliu (LHA 5) following a training exercise. At the time, Peleliu was en route to Hawaii to participate in Rim of the Pacific (RIMPAC) 2014.



## Strike Warfare

At its simplest, strike warfare can be defined as the use of aircraft, ships and submarines against targets on land. Conceivably, strike warfare can also entail attacks on targets on the sea surface, and sometimes it is used in that fashion. However, such maritime strikes are normally considered an aspect of surface warfare.

Ordnance carried by naval aviation and land attack missiles from surface ships and submarines are the primary kinetic tools of strike warfare. But the ability to conduct such strikes is dependent on information from organic and shore-based sources as to the disposition of the enemy and targets to be struck. As technology has advanced, the range of strike weapons have increased from ship gunnery at ranges of 12-24 miles, to 1000-mile attacks on land-locked targets. Naval strike weapons have proved to be the effective leading edge of joint strike operations, with attacks by sea-launched land attack cruise missiles and aircraft carrier aviation as in the opening salvos as such campaigns as Operation *Desert Storm*, Operation *Iraqi Freedom*, and Operation *Enduring Freedom*.

A principle of strike warfare is to initially focus on “killing the archer, not the arrows.” Initial strikes are generally conducted against sensors and command and control networks in order to blind the enemy to our operations and be unable to communicate with dispersed forces. Following initial strikes a suppression of enemy air defenses (SEAD) campaign can be conducted that eventually results in our ability to use the skies over the enemy for our continuing without substantial resistance.



*A Tomahawk land-attack cruise missile is fired from USS Bunker Hill (CG-52) against military targets in Iraq during Operation Enduring Freedom, 30 March 2003.*

## Surface Warfare

As is evident, surface warfare (SUW) is that which is conducted on the surface of the oceans. But that does not mean that it is the sole province of surface warships.

Far from it, surface warfare—traditionally known as anti-surface warfare (ASuW) is once again combined arms warfare with operations conducted against surface targets by naval aircraft and submarines as well as our own surface platforms.

This is a warfare area with a startling variety of weapon types: torpedoes, guns of various calibers, ship- and air-launched cruise missiles, guided and unguided aircraft ordinance, and perhaps in the future, directed energy weapons. Surface warfare may be the most traditional aspect of war at sea, but that has never made it less complex. Critical, of course, are electronic and information warfare capabilities, along with the cross-warfare function of command and control.

A principle of surface warfare is the netting together of the sensors and weapons systems of dispersed units so that they can provide both mutual support and attack. The mobility and sustainability inherent in surface platforms allow them to be brought into combinations that are tailored to the task—the origin of the term task forces. With the tremendous investment that our Navy has made in modern command, control and communications, dispersed surface units can achieve a concentration of force in order to apply their striking power at the most vulnerable part of the enemy. Concentration of forces against the enemy is a historical principle of war.



*Guided-missile destroyer USS Chafee (DDG-90) conducts live gunnery exercise off Hawaii, 15 November 2011.*





## Undersea Warfare

Undersea warfare (USW) consists of war by and against submarines--traditionally known as anti-submarine warfare (ASW)--and mine warfare (MIW). Due to the environmental conditions of the undersea dimension resulting from the properties of sound in water, USW has long been considered the most intricate and complex tactical problem. From the submarine's perspective, it is a war of silence and positioning, requiring the utmost effort to remain undetected while maneuvering into attack position. In order to overcome the submarine's natural advantages, the anti-submarine warfare forces again rely on combined arms warfare, combining air, surface, and its own undersea platforms in an intricate web of detection.

Different ASW platforms bring different capabilities and advantages (and individual disadvantages) into the fight: long-range maritime patrol aircraft can search wide ranges of ocean at relatively high speed; maritime patrol UAVs can do likewise requiring less fuel, but do not have onboard information processing capability; helicopters are the means for surface forces to conduct "stand-off" attacks on a submarine; ships provide persistence in conducting ASW, but they are also the platforms most vulnerable to submarine attacks; underwater unmanned vehicles (UUVs) can extend the range of prosecution; and attack submarines are perhaps enemy submarines' deadliest foe. Adding the elements of electromagnetic and information warfare and command and control, successful ASW can involve a wider range of naval platforms and capabilities than other warfare areas.

On the other end of undersea warfare is the threat and use of naval mines. Small, silent, relatively inexpensive, but deadly, naval mines have long been a primary weapon used to deny the access of navies into straits and littoral waters. While not necessarily a significant threat to navies operating in the open ocean,



*Sailors from the submarine tender USS Frank Cable (AS-40) prepare to lower a Mark 48 ADCAP (Advanced Capability) torpedo into the Los Angeles-class attack submarine USS Oklahoma City (SSN-723) at Polaris Point, Guam, 15 November 2012.*

they are a significant element of the anti-access capabilities of potential enemies seeking to deny our Navy the ability to conduct war fighting within the littorals. Enemy mines must be removed from the areas in which we will operate prior to moving surface warships in force. As in ASW, this requires a combination of platforms, air, surface, and UUVs, along with significant information processing and command and control capabilities.

Naval mining is an option that the U.S. Navy and the joint force retain in conducting sea control missions against a potential enemy.

A dominant principle in undersea warfare is the use of stealth. Submarines are the stealthiest platforms in the inventory of U.S. joint forces as a direct result of the properties of the undersea environment in which they operate. Submarines, like mines, are designed to remain undetected. ASW forces seek to penetrate this natural stealth in order to neutralize a submarine's attack capabilities. This is a most complex problem with a complex solution.

### *Example Principles of Naval Warfare (as illustrated by the warfare areas)*

- Defense in depth
- Combined arms warfare
- Deception
- Maneuver
- Knowledge from information
- "Killing the archer"
- Networked systems
- Use of stealth
- Maintain access to regional seas and the littoral

## Cross-Warfare Functions

In our discussion of naval warfare areas, we have identified command and control (C2) as a cross-cutting warfare function. To that we must add communications, computing, intelligence, surveillance and reconnaissance. The resulting acronym, C4ISR, is awkward, but does encompass many of the functions that must be performed in order to be able to utilize the capabilities required for each and every warfare area.

However, we must remember that almost every naval capability and operation cross warfare areas. Our sensors and systems are designed to perform multiple roles. An example of this is a surface warship Close-In Weapons System (CIWS) that was originally designed to provide point defense against incoming air and missile threats, but has been adapted (depending on configuration) for surface warfare against fast incoming surface targets. Another example of multiple/crosses warfare capabilities are amphibious warships—ships dedicated to amphibious operations—





conducting maritime security operations such as commercial ship escort; visit, boarding, search, and seizure; counter-piracy patrols, and international sanctions enforcement.

More importantly, every Sailor performs cross-warfare area functions in every watch. Information from a particular sensor—sonar as an example—might detect an undersea or a surface target. Every byte of information transmitted might provide a clue to enemy positions in any maritime dimension. The Combat Information Center (CIC) or Command Decision Center (CDC) in a warship epitomizes the synergy of cross-warfare area functions, since it is designed to conduct warfare in all dimensions simultaneously. In a very real sense, every Sailor performs a cross-warfare area, multi-dimensional task during watches and working hours.

Every task and every platform gathers some intelligence and information that can be put to use in operations conducted perhaps far away.



*The guided-missile cruiser USS Antietam (CG-54) fires its Mk 22 close-in weapon system (CIWS) during a live-fire gunnery exercise in the South China Sea, 23 October 2013.*

### Tying Warfare Areas Together: The Kill Chain Approach

In whatever its aspect, naval war fight can be seen as an application of the *kill chain approach*, which involves analyzing attacks as a four stage process: (1) find the target, (2) determine the target's location, course and speed, (3) communicate that information coherently to the platform launching the weapon, and (4) launch the attack using anything from kinetic weapons to electromagnetic systems to cyber attacks. This process operates continuously since the same steps need to be taken to conduct a follow-on attack, with the (1) *find the target* step involving battle damage assessment.

The importance of visualizing naval war fighting in this rather simple way is that it demonstrates how the whole of the naval enterprise is involved in developing the Navy's capabilities and conducting its operations. Even decisions on systems acquisition or personnel policies can be seen as a kill chain in that (1) a problem (the target) is identified, (2) the nature of the problem and the range of possible solutions are determined, (3) options for change or adaptation are transmitted to the decision-makers, and (4) a decision is implemented, monitored, and brought to practical completion.

Naval operations consist of a chain of kill chains, whether at sea or ashore. All decisions, whether tactical, administrative, or policy-making ultimately affect all other decisions. They must be wise and open to innovation if we can maximize their synergy across mission areas.

### Spectrum of Operations

Naval operations can be viewed as being along a spectrum of war fighting intensity. At one end may be routine peacetime functions and at the other end high-intensity, multiple warfare area combat against a major power. Certainly we hope that the latter never takes place, but that is the nature of our profession.

During a deployment, every ship, squadron or detachment can be expected to conduct operations across and on any point on the spectrum. We operate as a forward deployed, globally dispersed force, transiting through regions of potential crisis and conflicts. In doing so, we provide our Nation with capabilities that can be called on immediately as situations requiring American involvement occur.

We are not merely the point of the spear in high-intensity warfare, we are we are at the starting points of America's response to the problems of our world. We can operate in a disaggregated manner while fully networked, and quickly reassemble and reconfigure forces to deal with identified national needs. And if



*Sailors attending Navy Individual Augmentee Combat Training at Fort Jackson, SC, 12 January 2012.*



we are not already there, we can get there in a hurry, an ability in which we can take justifiable pride.

Perhaps we should use the terms “how we respond” to describe our actions on the non-combat side of the spectrum. But in light of the threat of global terrorism, our responses—even in seemingly benign environments—may need to escalate to deal with rapidly emerging threats. Preparations and training to deal with activities along the spectrum of conflict has been a Navy standard throughout history. With over a third of our ships underway each day, and more than half forward deployed or stationed—over 50,000 Sailors—we are expected to be able to respond. With more than 125 helicopters or maritime patrol aircraft operating forward in the littorals, some 4000 Navy Expeditionary Combat Command sailors and up to 1000 Information Dominance personnel operating overseas in 2013, for example, the strength of our Navy’s forces lies in their flexibility and adaptability across the range of joint military operations. This can be clearly seen throughout our recent and current operations.

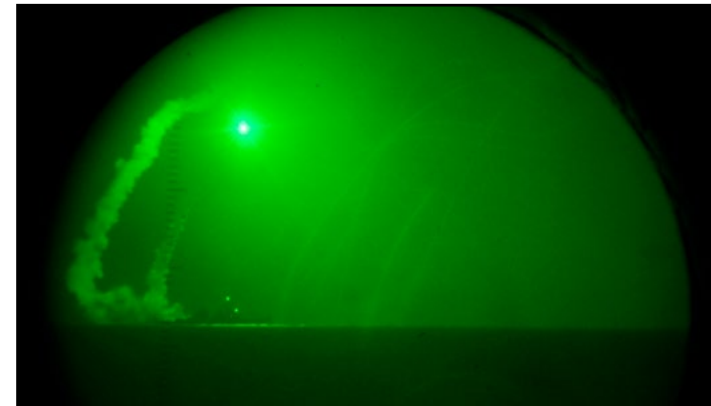
### Recent and Current Operations

Our Navy’s most recent combat operations have focused on projecting our combat power from the littorals to far inland. In Operation *Iraqi Freedom* (OIF), 2003-2011, the Military Sealift Command moved almost 21 million square feet of warfighting cargo for land forces ashore. Navy warships and submarines launched over 500 tomahawks and conventional air-launched cruise missiles against Iraqi military and government targets. Naval aviation supported strike sorties in the air campaign, flying approximately 65% of the power projection sorties during major combat operations. Furthermore, Navy Seabees, medical personnel, chaplains and others provided direct support to Marine Forces on the movement towards Baghdad. Navy special operation forces (SEALs) conducted a myriad of missions.



*U.S. Navy SEALs search for al-Qaida and Taliban in the Jaji Mountains, Afghanistan, 12 February 2002.*

As the war effort expanded in Iraq, naval aviation continued to be engaged and the Navy provided thousands of Sailors as Individual Augmentees (IAs) to various units in the joint force. These augmentees performed missions across the spectrum of conflict. Integrating into joint, Army and Marine Corps staffs and commands, Sailors applied their Navy attributes learned at sea to their work ashore. The joint force quickly came to realize how valuable these Sailors were because of their inherent attributes of self-reliance, initiative, and resilience. Demand for Navy IAs increased as land forces realized Sailors inherently feel comfortable working in a multi-mission, complex environment with many variables at play. As an admiral noted, “Ground commanders in Iraq and Afghanistan love our Sailors’ ability to adapt to changing demands and find solutions outside of their MOS [military occupation specialty].” At one point during the twelve years of combat in Afghanistan and Iraq, the Navy had more Sailors ashore in Central Command (CENTCOM) than underway in that same region.



*Seen through night-vision lenses, the guided missile destroyer USS Barry (DDG-52) fires Tomahawk cruise missiles in support of Operation Odyssey Dawn. This was one of approximately 110 cruise missiles fired from U.S. and British ships and submarines that targeted about 20 radar and anti-aircraft sites along Libya’s Mediterranean coast, 19 March 2011.*

The ongoing Operation *Enduring Freedom* (OEF), which commenced in 2001 in response to the Al Qaida terrorist attacks on New York and Washington, DC on September 11, involves the operations in Afghanistan as well as a number of counter-terrorism operations in the Philippines, Horn of Africa, and elsewhere. Afghanistan combat operations against the Taliban included Navy warfighting in a land-locked country. Again, naval aviation, surface warships and submarines conducted strikes against land targets. As noted, in the initial removal of the Taliban from power, naval aviation conducted 70% of the combat sorties. Over 50 Tomahawk missiles struck targets in Afghanistan in the opening hours of the operation.

As they did during Operation *Iraqi Freedom*, naval aviation, Navy Seabees, medical personnel, chaplains, and others provided direct support to Marines in





combat throughout OEF. Navy SEALs conducted routine missions against the Al Qaida and the Taliban throughout the theater, culminating in the death of Al Qaida leader Osama bin Laden. Meanwhile, hundreds of Sailors also served as IAs in a wide variety of missions throughout the joint force.

Operation *Odyssey Dawn* (19-31 March 2011), the NATO effort to protect Libyan civilians from forces loyal to Muammar Gaddafi (in support of United Nations Resolution 1973), also began with U.S. and United Kingdom (UK) forces conducting Tomahawk strikes from ships and submarines. Over 110 Tomahawk missiles were launched. Naval aviation conducted numerous sorties during joint operations. The operation Joint Task Force was initially established on board the command ship *USS Mount Whitney* (LCC-20) to provide command and control for all coalition forces. The Joint Task Force later transferred to direct NATO control, however, the continuing NATO-led operations included U.S. Navy units.

While these combat operations were ongoing, other Navy units completed counter-piracy patrols off the Horn of Africa and in the North Arabian Sea; promoted naval capacity-building by non-traditional partner nations through deployments to Global Maritime Partnership stations, both off the west coast of Africa and in the Pacific; conducted humanitarian relief operations in Haiti—Operation *Unified Response*--following a massive earthquake in 2010; carried out freedom of navigation (FON) operations in support of international law; and participated in numerous other operations.

One can conclude from these recent combat operations that our Navy possesses an ability to affect the outcome of conflict on land to a greater extent than ever before in our history. The attributes of the Navy and its forward deployment/forward presence posture give our Nation options for actions that transcend the maritime environment. One might also conclude that the operations that our Navy will conduct in the future will primarily consist of strikes against land, maritime security and counter-terror operations, and humanitarian assistance. But that might be an unwarranted assumption as other nations strive to expand their sea power.



*The guided-missile cruiser USS Lake Erie (CG-70) transits the East China Sea with ships from the Bonhomme Richard Amphibious Ready Group and Republic of Korea Navy, Commander Flotilla Five, 27 March 2014.*

## Future Trends with Operational Effects

- Increasing intensity of electromagnetic maneuver and information warfare
- Increasing use of unmanned and autonomous vehicles
- Advent of energy weapons

## Future Operations

Despite a globalized world economy, political tensions between great nations remain. Political conflicts exist in the South China Sea and elsewhere concerning the sovereignty of islands and reefs and control of undersea resources. At the same time, potential opponents of the United States—authoritarian powers that pose military threats to their neighbors—have sought to build networks of sensors and weapons systems intended to keep the U.S. Navy out of regional and littoral waters. Such *anti-access* efforts—strategies intended to deny access to a region--involve the creation of new naval capabilities designed to directly challenge U.S. sea power. This is a situation the U.S. Navy has not faced since the collapse of the Soviet Navy at the end of the Cold War in 1991. The logical implication is that war at sea is becoming a greater possibility and an increasing threat.

This brings us back to the maritime environment and its many dimensions in order to refocus our efforts to re-master the naval warfare areas that we have discussed. In a future in which rising powers are building more capable navies and seek to extend their range of influence, our operations may be less like those of the recent past, and more like those of the Cold War and before. No one wants a war—whether hot or cold. But if wars between major powers were to occur in the future, they would likely involve intense combat at sea.

Among the many future trends driven by the continuing evolution of technology, there are three that appear to have the most significant effects on our future operations: increasing intensity of electromagnetic and information warfare; increasing use of unmanned vehicles; and the advent of energy weapons.

We have already discussed the importance of the electromagnetic maneuver and information warfare areas. These are critical areas in which to focus training and resources because the technical means of disruption are continually evolving while global dependency on information systems increases. Likewise, for many years we have assumed that our sensors and communications systems would be able to utilize the electromagnetic spectrum without significant interference. That is no longer the case with the development more sophisticated jamming systems and the destructive capacity of electromagnetic pulse (EMP) weapons against sensitive electronics. Future operations will undoubtedly involve an even greater struggle for control of the electromagnetic spectrum on which our cross-warfare C4ISR systems depend.

Our Navy has greatly increased its investment in air, surface and undersea





### Conclusion: Three Tenets for Current and Future Operations

Whether technological trends stay on course; whether future operations consist of strike against land, MSO, HA/DR, or war at sea; three tenets will continue to guide our Navy throughout our maritime operations. War fighting will always remain our focus. We will operate from a forward deployed position. And we will strive to be ready for any contingency. Forward, engaged, ready; our Nation expects no less from its Navy.

unmanned vehicles. Development of unmanned undersea vehicles for mine hunting and neutralization has been ongoing for the past decade. We are now preparing large carrier-launched unmanned aerial vehicles (UCLASS) at the same time we invest in land-based maritime patrol UAVs and ship-based tactical UAVs. Unmanned surface vehicles are largely in the experimental stage, but they too appear to have promise for harbor defense and force protection. Many of these unmanned vehicles will operate autonomously based on pre-planned mission profiles and may not be under direct control. A great deal of learning will be required in order for us to be able to use autonomous vehicles safely and effectively.

Unmanned vehicles will *not* completely replace manned platforms, but future naval operations will increasingly involve unmanned systems, perhaps requiring significant changes in our tactics, techniques and procedures.

Navy research and development of energy weapons appear to be on course to delivering revolutionary results. Lasers are being integrated into the fleet for C4ISR and force protection uses, but it also seems a matter of time before directed-energy weapons become primary weapons systems for ships. A limiting factor has been the amount of energy that can be generated by ship propulsion and auxiliary systems, which is why we are developing all-electric drive power plants and other means to increase shipboard power generation for use by the future directed-energy weapons.

A most promising energy weapon development is the Electromagnetic Railgun, which, when fully developed, has the potential to revolutionize the role of ships gunnery and reduce our reliance on more expensive missiles.



*Photograph taken from a high-speed video camera during a firing of an electromagnetic railgun (EMRG) at Naval Surface Warfare Center, Dahlgren, VA, 31 January 2008.*



## Conclusion

Explicit operational concepts and a heroic history are not by themselves guarantors of future effectiveness. Rather, future effectiveness is guided by the ability to continually combine our mastery of the maritime environment, the attributes needed for victory, the lessons learned from our history, and tested operational concepts and doctrine into a superior approach to warfighting. How we fight is not simply about weapons and platforms; it is about how all the characteristics of the Naval Service connect a network of capabilities.

### Combination of Environment, Attributes and Warfighting

Upon examination, the logic of this combination becomes evident. To survive and master the maritime environment requires an individual to develop attributes derived from our core values of honor, courage and commitment: mutual trust; personal initiative; resilience; self reliance; and willing obedience to lawful and competent authority. These are the same attributes that make a brave, professional, and moral war fighter.

These attributes are more than individual ones. They are required for the creation of an effective team—a crew of war fighters. All naval warfare is crew-fought combined-arms combat. Even naval special warfare operators fight on land as teams, not individuals. The attributes forged in day-to-day operations in the maritime environment are the same needed for naval warfare. Combined with the training and experience that develops war fighting skills, the collective attributes of U.S. Navy Sailors are the keel from which victory at sea is built.

The combination of mariner, war fighter, and honorable shipmate that forges Sailors together into a crew does not end at the level of the ship, our basic building block for operations. Ships, submarines, aircraft, and shore based commands combine to provide task forces and the overall U.S. Fleet. These combinations are both the defensive and striking power of our joint military strength in the far regions of the world, and particularly in areas of conflict and crisis in which American forces are not stationed on land. Task forces carry out their assigned warfare area responsibilities that provide both mutual support and dynamic synergy. This represents the culmination of putting into practice the attributes we have discussed.

### Take the Initiative

Of all the attributes, perhaps initiative is the most critical to our war fighting success. Part of the purpose of this book is to inspire all Sailors to broaden their knowledge of naval war fighting beyond their particular specialty, and take the initiative to apply this knowledge throughout their careers.

What defines a crew from a crowd is collective obedience to the orders of a captain who is respected as a war fighter and a seaman, and who develops an







environment in which individual Sailors work to complete the mission. Members of a crew can work together autonomously based on training and experience, each manning their watch station and applying the skills and practices they have learned. When, however, the friction and fog of war becomes part of the war fighting equation, it is the individual initiative of the Sailor, the collective initiative of the crew, and the tactical initiative of the commander that means the difference between victory and defeat, survival and destruction. This initiative is a blend of honor, courage, and commitment with knowledge, training, exercises and experience. Hopefully this volume has contributed to furthering and organizing your knowledge.

### Challenges of the Future

Many declare that the future cannot be predicted, and it is often said that we are constantly surprised by emerging threats to our national security. While it is indeed true that no one can exactly predict the particulars of individual future events, as naval professionals, we can know the outline of the future because so much of it is a continuation of past human experience and the realities of our world.

The earth is mostly ocean. That will not change. By its very nature, the ocean has characteristics that make it dangerous and inhospitable to humans. The ocean is vast and opaque. It is a medium in which military forces—those that have mastered the environment—can maneuver, mask their intent, and strike with surprise.

Many have predicted that technology will make the oceans transparent and that naval forces will be tracked easily, limiting their effectiveness. However, to use a civilian example, events surrounding the disappearance of a Malaysia Airlines Flight in 2014 reveal how difficult it is to track or locate platforms operating over oceans despite local radar, satellite observation and communications, or computer modeling. This is in a situation in which the platform was presumably not attempting to utilize deception. Translating this into military operations, it remains apparent that the oceans will remain an optimal medium in which to conduct far-ranging maneuver with a still-limited possibility of being detected. In short, we can recognize the outlines of future naval effectiveness in a challenging environment.

The ocean allows for the efficient transport of heavy resources and is the basic means for global trade. Even with an advent of extensive 3-D printing, this remains true since the materials for such manufacturing must come from somewhere—and if they come from overseas, they most likely come by sea. Seventy percent of the world is ocean, eighty percent of the world's population lives near the sea, and ninety percent of the trade in goods and resources travel by water. That will not change in the future because it is a matter of geography. If America wishes to remain economically prosperous, it needs to retain the freedom to use the seas.

For economic prosperity, freedom of the seas is like oxygen: one can't survive



without it, yet one does not notice it until it is absent. Maintaining freedom of the seas will be a future mission; it is not going away.

Historically, U.S. land-based forces overseas have been relative small, tailored for current crises, and rely on the deployment of follow-on forces and logistics from the United States. This can only be done if the oceans are secure bases for American operations. This is also a reality that is not going away in the future, particularly with constrained defense spending. Being able to project power in regions in crisis where land-based forces are not available, and maintaining the ability to ensure that land-based forces can be reinforced overseas, will remain U.S. Navy missions into the far future. This is a factor of both geography and the evolution of global politics—the maritime political environment.

The United States maintains an extensive network of allies and partners who have national interests in a common defense and deterrence of potential threats. Interoperability with them can be achieved at many levels of our joint armed forces, but ultimately it is operational control of the adjacent seas that provides the linkage between the U.S. and these nations. That will not change if the U.S. retains its involvement in world affairs.

While we cannot predict particular events, the U.S. Navy does know the basic parameters of its future missions and the challenges it will face. If they seem similar to those of the past, it is because of the realities of oceans, geography, trade, and human nature. These future missions will continue to require the approach that has been outlined throughout this book: mastery of the maritime environment, effective war fighting, and the lessons learned through history. This is an approach designed to deal with future threats, not just current or past.

### Enduring Principles

There are enduring principles that guide the U.S. Navy. Many of the operational aspects of these principles were discussed in Chapter 4. These principles are derived from the elements of environment, attributes, and history described in the previous three chapters.

There are a number of ways to articulate the guiding principles, but most recently we have come to describe them in terms of three imperatives or simple tenets: (1) Warfighting First, (2) Operate Forward, and (3) Be Ready.

Warfighting is our purpose. Although naval forces are excellent means for conducting non-combat missions in the far reaches of the world, such capabilities are inevitably subordinate to warfighting. This is the basis for the deterrence of conflicts.

The strategic objectives of the United States require a navy that operates forward in overseas regions. This not only ensures the Navy is where it matters, when it matters, it allows for the protection of our international trade and respect for the freedom of the seas. As we have seen in our history, during those periods in which the Navy did not operate forward and was restricted to coastal defense, the United States itself could not be defended. The facts of geography necessitate a





maritime defense at the overseas sources of the threats to our national security.

Readiness is woven throughout our every action. All our efforts must contribute to current or future readiness. Anything that does not in some way contribute to readiness—whether it is the readiness of ships or personnel—should have no place in our plans. Ultimately, the focus on readiness is the mark of good stewardship of our resources—ensuring that the capabilities that we design, develop and acquire can be put to use.

## Naval Professionalism

The U.S. Constitution specifically charges Congress with the responsibility “to provide and maintain a Navy.” Our sacred oath is to support and defend the Constitution of the United States. In a democracy, allocating resources to maintain a Navy is and will always remain a political issue, and we defend the freedom that allows it to be a political issue. As naval professionals, we have the responsibility to ensure that highest possible level of naval war fighting capability and readiness with the resources we are allocated. To do that requires us to understand our environment, utilize our attributes, learn from our history, and develop operational concepts, tactics and procedures that can match any threat to our national security.

Admiral Arleigh Burke once said, reflecting on the ship class that would bear his name, “This ship was built to fight. You better know how!”

The U.S. Navy is built and maintained for warfighting. As naval professionals we must study, practice and apply “how we fight.”



1010010001011001010100101000



0110100100